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Amazing Ribs Made Easy

Everything You Need To Know About America's Favorite Food:

Pork Ribs

version 2.0

By Meathead & Clint Cantwell

A DEEP DIVE GUIDE FROM
Meathead's AmazingRibs.com

AMAZING RIBS MADE EASY

EVERYTHING YOU NEED TO KNOW ABOUT AMERICA'S FAVORITE FOOD

MEATHEAD

with

CLINT CANTWELL

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Version 2.0

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PART I
ABOUT DEEP DIVE GUIDES

"This is my invariable advice to people: Learn how to cook – try new recipes, learn from your mistakes, be fearless, and above all have fun!"

— JULIA CHILD

Deep Dive Guides is the ebook imprimatur of Meathead's AmazingRibs.com. It is a growing series of ebooks in which

we have attempted to share our breadth and depth of experience on a culinary topic. They are designed to give you an inexpensive deep dive into a topic so you come away knowledgeable and confident. They contain numerous links to pages on the internet and videos. You will enjoy this book best if you read it while you are connected to the internet.

Some of this content is scattered among the 2,000+ pages on Meathead's AmazingRibs.com. Although websites are great references, they are not great learning environments, not nearly as good as books. We think that binding together carefully edited articles in an organized flow from start to finish in book format, is a far better way to learn than from articles scattered around on a website.

Some of this info appears in other Deep Dive guides because we think that it is important that they all contain foundational info on such things as meat science, safety, tools, etc. So we have included the most important info within these pages, and written new, previously unpublished, related info. Enjoy!

PART II
INTRODUCTION

For his birthday in 2003, Meathead's wife bought him a cheap smoker and he was hooked after his first slab of ribs. One day, his neighbor, a former butcher, started bragging on his ribs and, always competitive, Meathead challenged him to a cookoff. Then he panicked.

So he went to Amazon to order all the books he could find on ribs and barbecue. To his dismay, there weren't many. Trained as a writer and photographer with some culinary chops, he saw an opportunity. He thought "I'll write a book about ribs!" To get things rolling, in 2005 he built a website, AmazingRibs.com (because in those days search engines listed results alphabetically). It had one recipe, Last Meal Ribs, which you will find later in this book.

Well it took him until 2016 to get that book off the presses. "Meathead, The Science of Great Barbecue and Grilling" was called "one of the 100 best cookbooks ever written" by *Southern Living* magazine, and page 206 has the recipe for Last Meal Ribs. So does this book.

In the meantime, his website has grown to more than 2,000 pages with hundreds of recipes from steaks to burgers to eggplant parmesan, almost all cooked outdoors, plus lessons on technique, science and mythbusting, as well as unbiased product reviews of hundreds of grills, smokers, thermometers, gadgets, and more.

Among them are some excellent ribs recipes, many of which we have compiled in this book, which also includes recipes from accomplished pitmaster Clint Cantwell, and just about

everything the two of us have learned about cooking pork ribs.

We have focused on pork ribs in this book because they are by far the world's favorite ribs and they can be found in almost every grocery store in North America. They are especially popular with kids and the kid in us who loves to eat pig candy on a stick with our fingers.

But we're here to tell you, beef ribs and lamb ribs are awesome. Your grocers may not stock them but they can order them for you. And if you ask, you may even be able to order bison ribs, water buffalo ribs, and alligator ribs! Click

these links for more about beef ribs and lamb ribs on AmazingRibs.com.

You need to master pork ribs at home because they can be significantly better than anything you will find in a restaurant. Because they take so long to cook properly, restaurants often cook them in advance and hold them until you order. This is akin to serving leftovers. Or they take shortcuts like turning up the heat, par boiling, and leaving the membrane on.

You also need to master ribs because they have become more and more associated with the Fourth of July. This is because slabs of ribs are a truly American Heritage dish. Originally a tough cut left for the slaves while the big house ate “high on the hog,” aka the loin that sits atop the ribs on the back of the animal.

Devour this book and you will emerge with the expertise to create this holy grail of backyard BBQ and family and friends will worship you. Be amazing!

ABOUT MEATHEAD

Meathead points at baby front ribs

Meathead is the barbecue whisperer, hedonism evangelist, and mythbuster who founded **Meathead's AmazingRibs.com**, by far the world's most popular outdoor cooking website. He is a BBQ Hall of Famer and the author of "**Meathead, The Science of Great Barbecue and Grilling**", a *New York Times* Best Seller that was also named "One of the 100 Best Cookbooks of All Time" by *Southern Living* magazine, one of "22 Essential Cookbooks for Every Kitchen" By **SeriousEats.com**, and one of the "25 Favorite Cookbooks of All Time" By **Christopher Kimball's Milk Street**.

He was previously a syndicated wine critic for the *Washington Post* and *Chicago Tribune*. He has taught at Cornell University's School of Hotel Administration in Ithaca, NY, and Le Cordon Bleu in Chicago, and he has judged food, wine, beer, and spirits around the world. He lives in the Chicago area with his wife, a PhD microbiologist and a food safety expert, so if you dine at his house you will eat and drink well, and safely.

CLINT CANTWELL

Clint Cantwell is AmazingRibs.com's Senior Vice President, charged with creating recipes, writing

articles, shooting photos, marketing, and a little bit of everything else.

With a passion for all things barbecue and grilling, Cantwell was named one of the “10 Faces of Memphis Barbecue” by *Memphis Magazine* in May 2015 and was the winner of the Travel Channel's “American Grilled” nationwide cooking competition series. He came to AmazingRibs.com from Kingsford.com where he served as editor for several years. He is also the pitmaster of Smoke in da Eye competition barbecue and grilling team.

From his childhood in Texas to years in Kansas City, Wisconsin, New Orleans, and New York, Cantwell's passion for barbecue and grilling runs deep as he travels the country in search of the people, places, and tastes that define our shared cooking culture. He lives just outside of Memphis with his wife, three children, and Charcoal the dog, sharing his grilling and smoking ideas, experiences, recipes, tips, techniques and more.

SPECIAL THANKS TO

Clint Cantwell, Senior VP and author of some of our favorite recipes, a few of which are on these pages

David Joachim, Executive Editor of Meathead's AmazingRibs.com

Prof. Greg Blonder, Science Editor of Meathead's AmazingRibs.com

And the rest of the team

ABOUT MEATHEAD'S AMAZINGRIBS.COM

Called "*By far the leading resource for BBQ and grilling information*" by Forbes, Meathead's AmazingRibs.com is all about the science and art of barbecue, grilling, and all forms of outdoor cooking. With more than 2,000 pages of free information, the site offers countless thoroughly tested recipes, tips on technique, original science research, myth-busting, and unbiased equipment reviews.

The site ranks among the most popular food websites in the US and is one of only a small number of sites in the Library of Congress' Food and Foodways Web Archive. Other sites in the archive include the Food and Agriculture Organization of the United Nations, James Beard Foundation, Southern Foodways Alliance, Jose Andres, US Food & Drug Administration, Oxford Symposium on Food & Cookery, and Seafood Watch. We are in good company!

The site has numerous extraordinary features, among them the world's largest collection of grill and smoker reviews by the world's only full-time grill and smoker tester, the

world’s largest collection of thermometer reviews and test results by an electrical engineer, a unique curing calculator, a salt conversion calculator, and it specializes in using science to bust scores of barbecue and grilling myths.

ABOUT THE AMAZINGRIBS.COM PITMASTER CLUB

The **AmazingRibs.com Pitmaster Club** is the world's largest barbecue association with more than 17,000 paid members who enjoy a lively community forum and more than 20 cool benefits to membership including monthly drawings with prizes worth up to $2,000. You are invited to take a free 30-day trial membership. No credit card necessary. Click here **https://AmazingRibs.com/pitmaster**

Here are some of the 20+ benefits to membership:

- You support **AmazingRibs.com** and help us grow
- We block all third party ads from members
- Free $9.95 Food Temperature Guide Magnet with 80+ benchmark temps
- Free ebooks
- Free sneak preview of **The Meathead Method**, Meathead's next book in progress
- Free **Barbecue News** magazine every month
- Free **Tailgater** magazine
- Exclusive recipes, recipes, recipes
- 3 monthly giveaways worth up to $3,000
- Exclusive audio and video content
- Cartoons
- Great discussions and debates with knowledgeable moderators and no race, religion, or politics flamewars allowed
- 3 informative monthly email newsletters
- Meat-Ups
- Discounts on products we love
- Members can buy cool embroidered Pitmaster Club bowling shirts or inexpensive T-shirts
- Membership certificate
- Support for Operation BBQ Relief
- Support for Global Alliance for Clean Cookstoves
- Easy Autorenewal

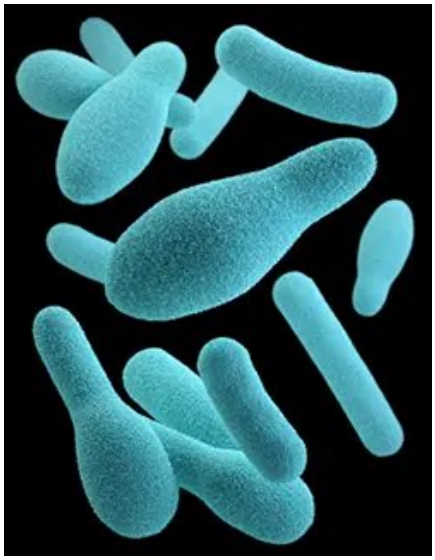
STAY IN TOUCH

Have a question? Meathead and the site's knowledgeable moderators answer reader questions promptly. Just go to Meathead's AmazingRibs.com and post your question on any page at the bottom where it says "Click for comments..."

If you find an error or a broken link in this book, please let us know here.

And be sure to subscribe to Smoke Signals, our free monthly email newsletter with links to new articles and reviews and more.

PART III
SAFETY FIRST



Fire, knives, pathogens, oh my! People can die from improper cooking. But the risk is very low with a little common sense and an ounce of prevention.

SPOILAGE

There are two types of spoilage: Oxidation and Microbial.

Oxidation is caused by compounds in meat, especially animal fats, combining with oxygen and changing the meat's smell, flavor, and color. Badly oxidized meat is called rancid. The good news is that oxidized meat is usually not dangerous.

Microbial spoilage is the other type of spoilage, and it is very dangerous. There are several commonly occurring *bacteria* and *viruses* in food that can spoil it. Some of these bad guys will merely have you kneeling before the porcelain god, but others can maim or kill you. The goal is to pasteurize the food, i.e. kill as many bugs as possible so that it is safe. That's different than sterilizing which kills every single microbes. We can easily *pasteurize* at home. *Sterilization* is a method that kills or removes all microbes and their spores by using one or more of the following: Heat, irradiation, chemicals, pressure, or filtration.

You can pasteurize most meats by cooking them to 131°F interior temp and holding it for two hours. At 165°F interior, bacteria are killed instantly. **For more on bacterial kill temps, click here and scroll down**.

BACTERIA

The Center for Disease Control (CDC) estimates that in one recent year roughly one in six Americans got sick from food, 128,000 were hospitalized, and 3,000 died. *The bad guys are certain types of bacteria, viruses, and parasites.* If you don't want the details, let's make it easy:

Cooking kills the bad guys. Cook food properly and you have nothing to worry about. Raw food is just plain riskier. All raw food and that includes salads.

Bacteria are everywhere. There are more microbes in your body than all other cells combined and they may weigh up to three pounds. **The biggest risks in food come from bacteria you ingest.** Most bacteria are friendly and many, called *probiotics*, are beneficial. Alas, some of them, called *pathogens*, are not so friendly, especially *Bacillus cereus, Campylobacter jejuni, Clostridium botulinum*, *Listeria monocytogenes, Salmonella, STEC* (*Shiga toxin* producing *E-coli*), *Shigella, Staphylococcus aureus*, and *Vibrio*. They are hard

to trace because they can often take a day or more to grow in your gut before they knock you down, so figuring out what it was in the fridge or if it was the restaurant lunch is hard to do.

VIRUSES

Viruses are not a major threat in food with one notable exception: *Hepatitis A* virus (HAV) a.k.a. *norovirus* usually comes from human fecal matter, often as a result of poor hand washing.

Coronavirus/COVID-19 is primarily a respiratory virus. It mostly infects the nose, throat, and lungs. Almost all infections come by inhaling droplets of moisture from the breath of other people who have been infected. The risk is greater the more viruses you inhale. The risk can be lowered by limiting your proximity to other people and by using a mask. Normal painter's masks can prevent you from spraying and can reduce the amount of spray you inhale, but they can't stop all the viruses. Masks labeled N95 are much more effective. That's what doctors prefer.

You can get sick by touching something that has the virus on it such as a grocery cart or an apple, and then transferring it to your respiratory system by touching your eye or the inside of your nose or mouth, or by eating food handled by someone who has the virus. The data says the risk of getting sick is low from touching things, especially if you wash your hands often, and keep them out of your eyes, nose, and mouth.

Food is not a likely carrier even if you eat with your hands. If the preparer is sick and washed his or her hands and didn't sneeze or cough on the food, there is likely to be no viruses or at worst a very small load (quantity of bugs). Keep in mind that food goes down one pipe and air down another so if the food is contaminated, it is possible it could get into your lungs because you breathe when you eat, but the risk is considered to be very very low.

PARASITES

Raw food can harbor parasites, most commonly adult tapeworm, tapeworm eggs, tapeworm larvae, and toxoplasma. Tapeworms are most commonly found in seafood. Cooking to 145°F will kill adult tapeworms as well as larvae and eggs. That is hotter than most chefs like to cook fish, even with conventional cooking. Fortunately, most parasites can be killed by freezing for 7 days at -4°F or for 15 hours at -35°F. Commercially frozen fish are often taken to these low temperatures. Alas, most home freezers are set to 0°F. So if you wish to cook fish to 131°F or below, you should consider buying commercially frozen fish.

Toxoplasma is found in shellfish and some mammals as well as contaminated water and cat litter. Fortunately toxoplasma is killed by freezing or cooking.

HOW DO FOODS GET CONTAMINATED?

That's quite a rogues gallery of potential contaminants. If you ingest enough bacteria, they can leave you sitting on the

toilet for hours, plant you on your knees in front of the porcelain god, send you to bed in a sweat and writhing in pain for months, propel you to the emergency room, or even the cemetery. Children and elderly are especially at risk.

It is helpful to think of all raw food as kryptonite. Of course most is perfectly safe, but you never know, and trusting your butcher is no guarantee because most contamination happens long before it hits his loading dock. And although fruits and veggies are not as frequently contaminated, if you pay attention to the news, you will know that recalls of lettuce, spinach, chili peppers, melons, sprouts, and strawberries are frequent because we eat them raw. Contaminated meats are decontaminated when we cook them properly.

The most common source of contamination is animal waste, and that includes human animals. If the bad breeds of E-coli get into water that is used for irrigation, if organic fertilizer is not sterilized properly, if Bambi or Thumper have lunch in a field of lettuce, if a steer's intestines are accidentally sliced open in the slaughterhouse, or if your butcher didn't wash his hands after using the toilet, we have a problem.

If a bluebird bombs a strawberry, if the henhouse isn't cleaned properly by a minimum wage teenager, if the water bath used to remove the feathers from chickens isn't disinfected, we have a problem.

Egg shells may look impervious, but if the hen has salmonella, it can get into the ovum before the shell hardens.

Raw fish sushi is silky and elegant, unless tapeworm eggs from seals, walruses, or whales get into your salmon. They can grow up to 60 feet inside a human.

Raw sprouts might seem like health food, but if Tweety decides to visit the alfalfa seeds or if rodents and insects nibble through the burlap shipping bags in the hold of a ship or warehouse, when we soak and warm the seeds to sprout them, we also water and warm the pathogens. **That makes sprouts the most dangerous food in the super market.**

Improper food handling also makes contamination from your hands, cutting boards, and knives a major problem.

MAKING FOOD SAFE

The most effective way to make food safe is to cook it properly. Raw food, of any kind, is always a risk. In the language of food safety scientists, you need a "kill step" in the process. Lemon juice, vinegar, alcohol, salt, and freezing will not pasteurize food. They may kill a few bad guys and hamper their growth, but they absolutely positively cannot be trusted to make food safe. Sorry, but they just don't get the job done. Acid and salt might inhibit growth, but they won't make your food or countertop safe. Remember, when research labs want to store their microbes, they freeze them.

To cook foods properly you must use a digital thermometer. Cooking without it is like driving at night without headlights. AmazingRibs.com has an electrical engineer who tests, reviews, and rates thermometers. His database of more than 200 is a valuable shopping guide. We do not sell any.

The excellent thermometer shown here, the Thermoworks Thermopop reads accurately in 5 seconds and sells for less than $30. **Click here to order it**.

A hot dishwasher and its detergent will make dishes and utensils safe. For countertops, cutting boards, knives, meat grinders, and other things that can't go in the dishwasher, chlorine bleach is your go-to sanitizer. That's why they put it in swimming pools.

You don't want to wash down your carrots with a poison. But chlorine is an excellent disinfectant for cutting boards, countertops, knobs, and handles. Buy an empty spray bottle at the drug store and fill it with a dilute solution of household bleach.

USDA recommends a solution of one tablespoon of 5% unscented, liquid chlorine bleach per gallon of water. After washing with warm soapy water, sanitize with bleach. Wet the surface with the bleach solution and allow it to stand for several minutes. Rinse with clear water and air or pat dry with clean paper towels. Store the solution in the bottle, tightly sealed, and use it often.

STORING RAW MEATS

Can you imagine life without refrigeration? We would eat only what we killed today, or we would all be vegetarians, or we would all be experts on pickling and canning.

But you cannot keep meat in the fridge or freezer forever. Even at standard refrigerator temp, 40°F, 3 to 5 days is the longest you should keep raw meat. Keep in mind, many meats you buy may have already been stored in grocery for several days. So it is best to cook meats soon after you get them home or freeze them. Meat kept in the fridge can still host and grow dangerous microbes, so just because it is chilled doesn't mean it is safe. Cooked meats, if wrapped well, can be kept for up to a week in the fridge before they get risky.

Frozen meats stay good longer. At standard freezer temperature, 0°F, most dangerous microbes cannot grow, so frozen meat can be safe for many months. But remember, freezing does not kill microbes. Oxygen in the packaging can change the flavor and texture of the meat, and the cold can

freeze dry it. When wrapping meat for the freezer, get out as much air as possible wrapping it first with form fitting plastic wrap. If you can, use a vacuum system to suck out the air.

Ground meats have more oxygen mixed in so they start tasting funny sooner than steaks. Pork gets funky faster than lamb which gets funky faster than chicken or turkey, and beef is the last to go.

In general, the bigger the hunk of meat, the longer it will keep. Here's a rough guide that can vary depending on how well you have wrapped the meat:

- **Ground pork and sausage:** 2 months
- **Ground beef or lamb:** 4 months
- **Pork chops:** 4 months
- **Pork roasts:** 5 months
- **Lamb chops:** 5 months
- **Steaks:** 6 months
- **Beef roasts:** 8 months

Why is meat in my fridge turning brown?

At first, oxygen reacts with pigments to turn meat red. After a while, the meat starts to oxidize, which turns it brown, the same way an apple or potato turn brown.

Why does my meat shine like a rainbow?

It is simply a fluke of lighting that strikes the surface just the right way when the surface has been cut on a certain angle. Strictly refraction, not bacteria or an oil slick.

Why is my meat green?

Bad bacteria. Throw it out.

Why are there are dry white spots on my meat from the freezer?

That's freezer burn. It's like frostbite. The meat has probably been in the freezer too long and/or it was not wrapped tight. It is still safe, but the burned parts will probably be dry and bland. Trim it off and cook it, but don't serve it to Mom or the boss.

My meat smells funny, what should I do?

Sometimes meat will smell a bit odd when you take it out of a vacuum sealed plastic bag, but the smell should dissipate within a few minutes. If it still smells funny, then chances are it is funny. Throw it out. Remember: when in doubt, throw it out!

What are those boogers coming out of my burgers and my salmon?

According to the AmazingRibs.com meat scientist, **Dr. Antonio Mata**, hamburger exudates (I call them boogers) are proteins dissolved in water, mostly myoglobin. When burgers are ground, plump muscle fibers are sheared open. As the meat begins to heat, protein and collagen shrink and squeeze out the proteinaceous fluids, which are pink at first, and then they gel and turn tan just like the meat.

In salmon, boogers consist of another group of proteins dissolved in water called *albumin*. The albumin is pushed to the surface by shrinkage caused by heat. Brining helps minimize it, but not always. Salmon boogers can usually be wiped off with a paper towel or a brush. Another good technique is to paint the surface with a simple wash of sweet wine, mirin, or a glaze.

WASHING FOOD AND CUTTING BOARDS

Rinsing meat can remove slimy fluids on the surface, but these are really nothing much to worry about. To be sure there are bacteria in them, but they will be killed instantly when heated. Rinsing is helpful to remove bone chips that might be on the surface from the butchering process because many cuts through bone are made with band saws.

Unfortunately, rinsing meat in the sink cannot remove bacteria which are embedded in the pores and cracks in the muscle surfaces. In fact, rinsing can make things worse by splattering microscopic contaminated droplets onto the sink and counters.

Jennifer Quinlan a food safety scientist at Drexel University in Philadelphia did some famous research in which she showed that rinsing meat aerosolizes tiny droplets of juices laden with bacteria all over the sink, faucet, surrounding counters, dish drains, and yourself.

Although she doesn't discuss it, the problem also arises in washing your cutting board.

She recommends you do not wash meats. But we know you want to. The solution is to turn down the water pressure and be careful not to splash. Or submerge the meat or cutting board in water.

HAZARDOUS FOODS

FOOD ALLERGIES

The Food Allergen Labeling and Consumer Protection Act requires that food packaging must declare prominently if it contains any of the eight most common food allergens: Milk, eggs, peanuts, tree nuts, fish, shellfish, soy, and wheat.

A good host will always ask guests in advance if they have any food allergies and either plan a menu that omits them, or plan a special dish for the guest with the allergy. Of course it is also the guest's obligation to inform the host so when dinner is served the host doesn't feel bad that the guest pushes away the plate.

The whole thing gets a bit complicated when people who don't have an allergy or celiac disease, but they have decided to avoid gluten or another food that they think is bad for them.

Common sense, courtesy, tolerance, and communications need to be the watchwords.

OTHER HAZARDOUS FOODS

So a food safety expert from the FDA was giving a seminar on food safety at a culinary school. Near the end of the talk she touched on the fact that some foods have effects that are cumulative and the hazard might not be evident for decades. She asked the audience if they could think of an example. After a few moments of silence an old codger in the front row raised his hand and mumbled “wedding cake.”

KNIFE SAFETY

Be alert and focused when using knives and sharp objects. Beverage alcohol and knives is a dangerous combo.

• Use sharp knives.

• Do not gesture and waive with knives in your hands.

• Always use a cutting board. Never cut anything in your hand.

• A damp towel or paper towel under a cutting board can help keep it from shifting.

• Make sure you have plenty of elbow room when cutting.

• If you drop a knife, get your feet out of the way and don't try to catch it! Wait for the knife to stop moving before trying to pick it up.

• Never open cans with a knife. I don't care what you saw on Iron Chef.

• Never use a knife as a screwdriver.

GRILL, SMOKER, OVEN, AND STOVETOP SAFETY

Grills, smokers, sideburners, and indoor ovens and stovetops can do massive damage to property and life if not treated with respect

• Never cook with grills or smokers indoors or in garages. They produce invisible carbon monoxide and smoke that can kill you.

• Don't keep your grill next to a furnace air inlet or even a window. The house is often under a negative pressure, and can suck in these killing gases.

• Don't keep your grill close to your house or deck railings. Beware of overhanging roof lines or trees.

• Never use gas, paint thinner, solvents, or kerosene to start your charcoal. **Chimneys or electric coil starters are the best way to start coals**, but if you use charcoal starter fluid, once the coals are smoldering never squirt them with more fluid. The flame can climb up the stream and set you on fire.

• Don't cook near gasoline or other flammables. Keep propane tanks at least two feet from the burners unless there

is shielding.

• On gas grills, always lift the lid when you ignite the burners. If you have one burner lit and want to add others, it is safe, just open the lid. A gas buildup under the hood could blow it open and flash in your face.

• On kamados and eggs, the lid seal is very tight so when you open it, air rushes in and it can flash flame in your face. Stand back and open the lid slowly.

• Store propane cylinders outdoors in an upright position.

• If you smell gas, turn off the grill immediately. On New Year's Day 2013 ESPN host Hannah Storm returned to the air with a bandaged hand, a wig, false eyelashes and eyebrows. She was injured when trying to ignite her propane grill after the wind blew the flame out. Unbeknownst to her, the gas continued to course through the jets and pooled in the lower chamber because it is heavier than air.

• Handle hot grills, coals, and hot liquids with respect. Be alert. No horseplay near cookers.

• Keep children and pets away from grills and smokers, uncooked meat, hot liquids, and sharp objects.

• Use potholders and/or insulated gloves.

• Do not discard ash until the coals are thoroughly dead. Let them sit overnight or dump water on them before you put them in your trash can.

• Bare feet, sandals, flip-flops, and loose clothes are dangerous around grills.

• Don’t put small grills on flammable surfaces or glass tables.

• Before you use a new grill or smoker, fire it up on high and let it run for about 30 minutes to burn off any oil or grease or packing materials from the manufacturing process or from shipping. Click here to read more about **Seasoning and Calibrating a New Grill or Smoker.**

• Save the grill manual and remember where you put it.

• If you have long hair, tie it in a pony tail. And grilling is yet another great excuse to not wear a tie.

• If you pour water over hot coals, it will produce enough steam to melt your nose, and enough hot water will come out of the bottom to melt your toes.

• Heat the grates to high before cooking and carbonize grease and scraps from your last cook. Then scrub them off (read **more about grate cleaning**). If you use a wire brush, beware that bristles can come out and people have died from wire bristles that lodge in their digestive system. Before the food goes on, use a damp cloth and tongs to wipe off the grates and visually inspect them.

• Make sure handles of pots and pans are not sticking out over the edge of a table or counter where people walking by can bump them.

• Do not fill pots to the brim. Liquids expand when they are heated.

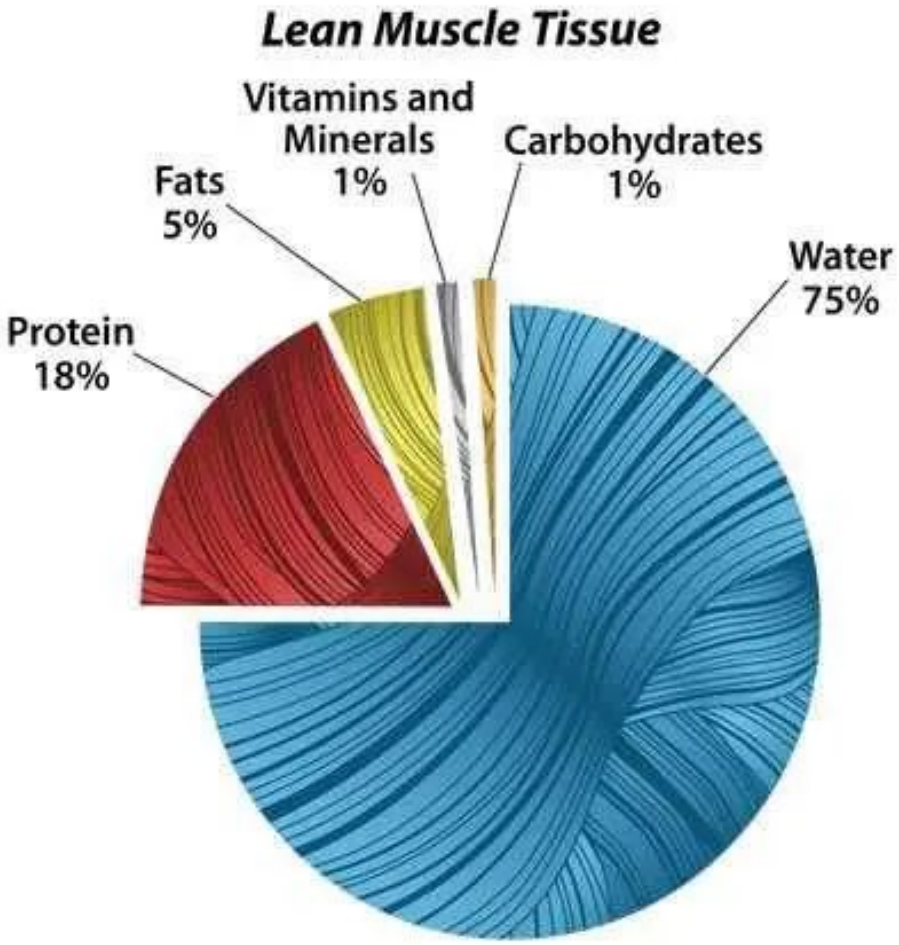
- If you put a wet liquid into hot oil it will spit hot oil at high velocity right at your eyes with deadly accuracy.
- Keep pets away from the front of the stove.

PART IV
SCIENCE

Whenever you set foot in the kitchen or sidle up to the grill or smoker, you commence a chemistry and physics experiment. Food is a complex chemical compound and when you apply energy in the form of heat you are using physics to alter its chemistry. As scientific as these processes are, they are also magical!

We could just feed you a bunch of recipes and techniques, but if you understand the chemistry and physics, well, you really don’t need any recipes!

MEAT SCIENCE



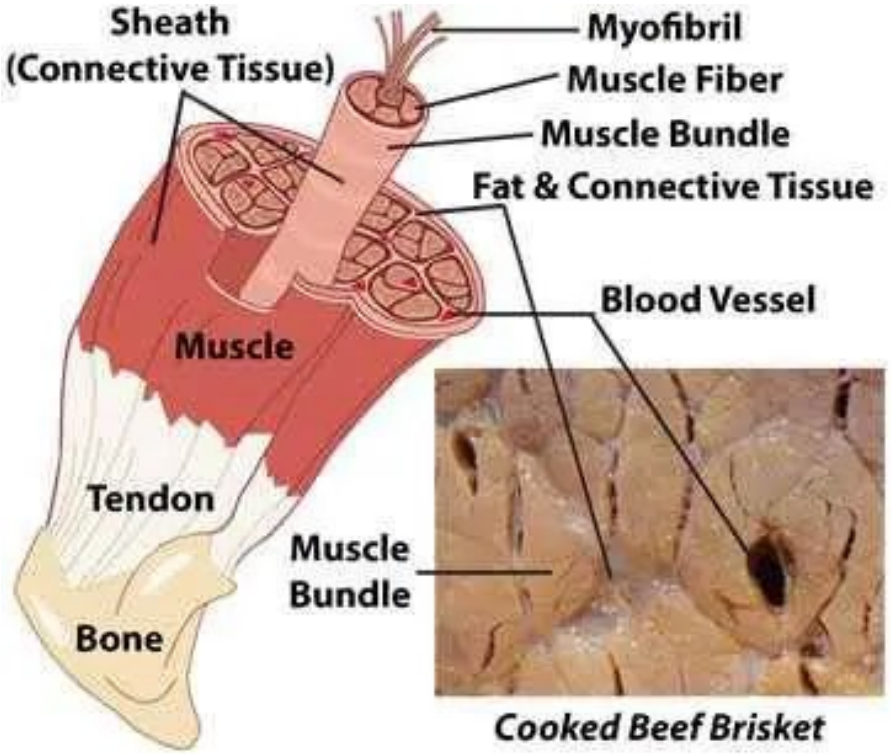
Meat is cut from the muscles of mammals and birds. For some reason, fish muscle is not

considered meat by some people, but it should be. It is fish muscle tissue.

On average, lean muscle tissue of mammals typically breaks down like this: Water (about 75%), protein (18%), fats (5%), carbohydrates, salt, vitamins, sugars, and minerals (2%).

MUSCLE CELLS

Muscle cells are more frequently called *muscle fibers* because they are shaped like tubes. Muscle fibers bundled together are called *sheaths*, and sheaths bundled together are called *muscle or meat.*



The fibers, about the thickness of a human hair, contain several types of protein, among them *myosin* and *actin* which

bind up water and act like living motors by contracting and relaxing on command by nerves. As an animal ages, grows, and exercises, its muscle fibers get thicker and tougher.

Myoglobin is another important protein in muscle fibers. Myoglobin receives oxygen and iron from *hemoglobin* in blood, fuel necessary for muscles to function. Myosin and actin are not water soluble, but myoglobin is water soluble, and myoglobin is the protein in meat that makes it appear red.

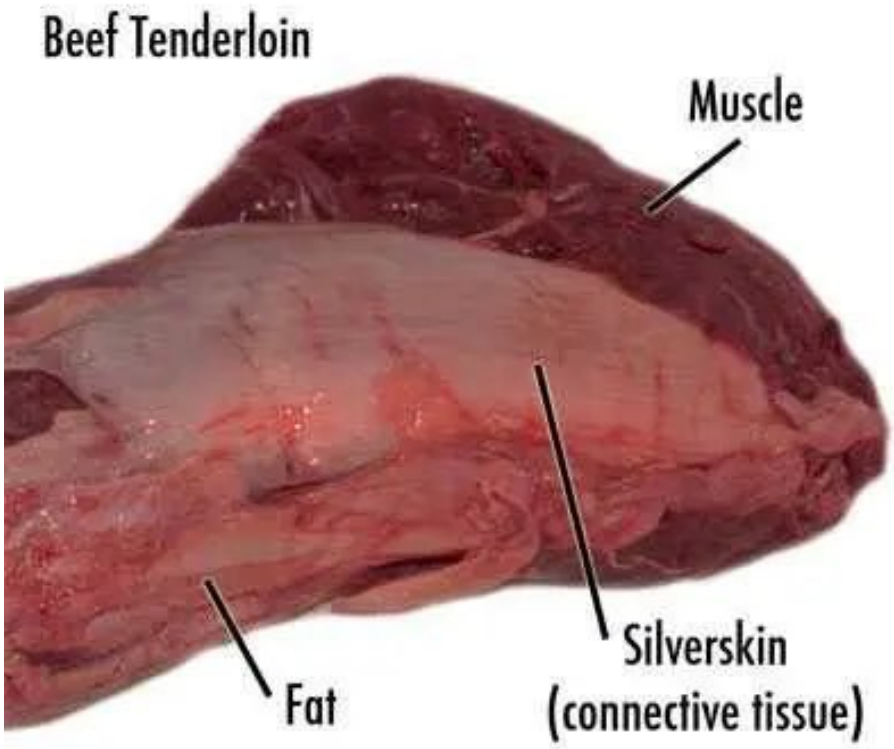
That's right, the reddish color in meat and its juices *is not caused by blood.* It is myoglobin dissolved in water, called *myowater*. Myoglobin is found only in muscle, not in the blood stream. The blood is pretty much all drained out in the slaughter house. If the stuff on your plate when you sliced a

steak was blood, it would be much darker, like human blood, and it would coagulate, like human blood. If the fluids were blood, then pork and chicken would be dark red. It's mostly just water, so let's stop grossing out our kids, and just call it juice. OK? **Every time you call meat juices blood, a bell rings and a teenager becomes a vegan.**

On average, beef has 8 milligrams of myoglobin per gram of meat, **according to the meat scientists at Texas A&M University's Department of Animal Science**, making it one of the darkest red meats. Lamb has about 6 milligrams per gram, pork about 2 mg/g, and chicken breast about 0.5 mg/g. If pork is the other white meat, lamb is the other red meat. When warmed, meat juices containing myoglobin lose their red color, become lighter pink, and eventually tan or gray.

Most of the liquid in meat is water. When animals are alive, the pH of the muscle fibers is about 6.8 on a scale of 14. The lower the number, the higher the acidity. The higher the number, the more alkalinity and less acidic. At 6.8, living muscle is just about neutral. When the animal dies, the pH declines to about 5.5, making it acidic. At this pH, muscle fibers form bunches and squeeze out juice, called purge, and that is the juice you see in packages of meat that is absorbed by the diapers that butchers put under the meat.

Muscle fibers also contain other proteins, notably, enzymes. **Enzymes play an important role in aging meat**.



CONNECTIVE TISSUE

Connective tissue is most obvious in the form of tendons that connect muscles to bones and in ligaments that connect bones to other bones. It is also visible as the thin shiny sheathing that wraps around muscles called silverskin or fascia. These tougher, chewier, rubberband-like connective tissues are mostly *collagen* and *elastin* (as opposed to the muscle, which is mostly *myosin*.) We call them gristle and they shrink when heated and become hard to chew. As with muscle fibers, connective tissues thicken and toughen as an animal exercises and ages.

A softer connective tissue called *collagen* is scattered throughout the muscle, often surrounding fibers and sheaths

holding them together. And yes, this is pretty much the same stuff the Hollywood wives have injected into their faces to get rid of wrinkles.

When you cook, collagen melts and turns to a rich liquid called *gelatin*, similar to the stuff Jell-O is made from. Cooked muscle fibers, no longer bound together by collagen, are now uniformly coated with a soft, gelatinous lubricant. This smooth and sensual substance enrobes meat in a wonderfully silken texture and adds moisture.

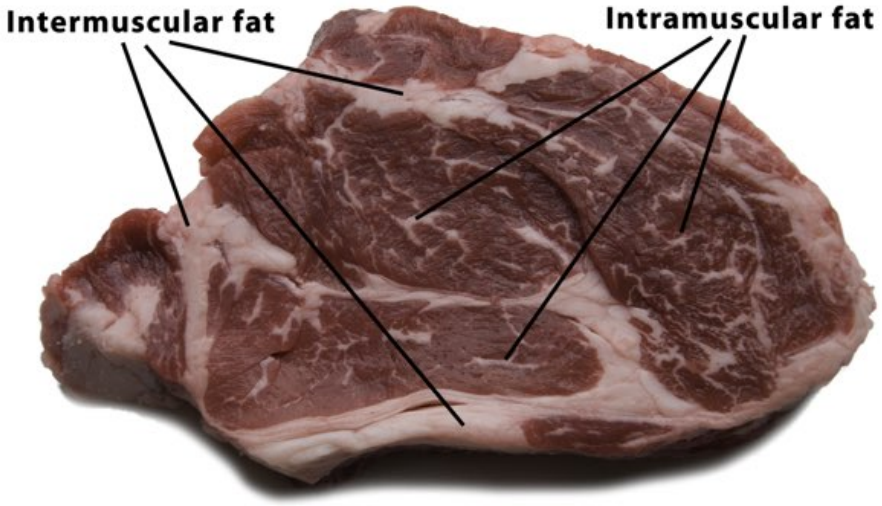
Lean meats such as beef or pork tenderloin, as well as most chicken and turkey, don't have much collagen. When cooking tough cuts of meat with lots of connective tissue, like ribs, brisket, and shoulder, it is important to liquefy the meat's connective tissue into gelatin: that's what makes these tough meats taste tender. This takes time. That's why these cuts are often cooked low and slow.

Muscle fibers start seizing up around 125°F to 140°F if heated quickly. But when heated slowly, the rubber band-like connective tissues have time to relax and do not squeeze tightly. In general, we believe it is best to cook all meats at about 225°F. Slow roasting does wonders for meat. The AmazingRibs.com science advisor **Prof. Greg Blonder** says "Think of silly putty. Pressed hard and quickly, it acts like a rigid solid. Pressed slowly, it flows." When heated slowly, the muscle fibers, instead of wringing out moisture, relax and simply let water linger inside until evaporation drives it out.

After it melts, as it chills, gelatin can solidify into that jiggly stuff which, with a little filtering, can then be called aspic and served at bridge clubs. Here's a pot of the stuff made simply by boiling a couple of chicken carcasses in water after I ate the meat, discarded the bones, and chilled the liquid. The white is fat, most of which I have removed, and the tan is jiggly gelatin.

FATS

Fats (*lipids*) and oxygen are the main fuels that power muscles. Fats are packed with calories, which are potential energy released when the chemical bonds are broken. From a culinary standpoint, fat comes in three types:



- **Subcutaneous** fats are the thick hard layers beneath the skin.
- **Intermuscular** fats are layers between muscle groups.
- **Intramuscular** fats woven amongst the muscle fibers and sheaths improve meat's moisture, texture, and flavor when cooked. These threads of intramuscular fat are called marbling because they have a striated look similar to marble.

Large fat deposits can also be found around organs, especially kidneys. On hogs, the best fat of this type, at least from a culinary standpoint, especially if you make pie crusts, is called leaf lard, and it comes from around the kidneys.

Fats are crucial to meat texture. Waxy when cold, fats start to melt around 130°F to 140°F, lubricating muscle fibers just as they are getting tougher and drier from the heat. Fat does not evaporate like water when you are cooking.

Fat also provides much of the flavor in meat. It absorbs and stores many of the aromatic compounds in the animal's food. As the animal ages, those flavor compounds build up and get more noticeable. After the animal is slaughtered, the fat can turn rancid if stored too warm, too long, or in contact with oxygen. So we have a tradeoff. The muscle fibers and connective tissues get tougher as the animal ages and exercises, while the fat accumulates and builds flavor.

Fats, especially animal fats, are the subject of great debate among scientists, doctors, dietitians, and health faddists. For many years, animal fats were thought to be dangerous and avoided. It is now thought that fats, even animal fats, contain many beneficial components, and current science argues that, in moderation, they are essential for health. A great deal of interesting research on the subject is going on as we write this. A great deal of research is contradictory. **Read more about what we have learned about food and health in this article**.

SLOW TWITCH VS. FAST TWITCH MUSCLES

Muscle fibers need fat and oxygen for fuel. Fat comes from fatty acids in the animal's blood that were created by digestion of its food. Oxygen is carried by the protein *hemoglobin* in the bloodstream, and it hands the oxygen to myoglobin within the muscles.

In general, the more exercise a muscle gets, the tougher it is, and the more oxygen-laden myoglobin it needs. Myoglobin turns meat darker and makes it more flavorful. Dark meats,

like beef, lamb, duck, and goose, are made of “slow twitch” muscles that have evolved to endure slow, steady movement, and they are loaded with juicy myoglobin. Dark meats also have more fat for energy.

White meats, like chicken breasts, are mostly “fast twitch” muscles, which are better suited to brief bursts of energy, and they have less myoglobin. Chicken legs are slow twitch, and even though they are not red, they are darker than breasts. When cooked, the slow twitch muscles in dark meat have more moisture and fat and are more flavorful than white meat. White meats contains less moisture and fat, and they dry out more easily when cooked. Poultry gets more exercise standing and walking than flying, so the legs and thighs have lots of slow-twitch muscles, more pigment, more juice, more fat, and more flavor. They are also slightly more forgiving when cooked. Modern chickens and turkeys have been bred for large breasts because white meat is more popular in this country (and we can’t understand why). We’ll take tough and flavorful over tender and mild any day.

Ducks and geese excel at flying and swimming, and they get more exercise than chickens and turkeys, so these birds have more dark meat. Duck and goose breasts are deep purple, almost the same color as lamb or beef.

When the conventional wisdom was that dietary fat could cause heart and arterial problems, domestic pigs were bred to have less intramuscular fat. The modern pig does not get much exercise due to its transmogrification into “the other white meat.” In recent years, research has questioned the

relationship between dietary fat and health, and many experts now extol fat's benefits.

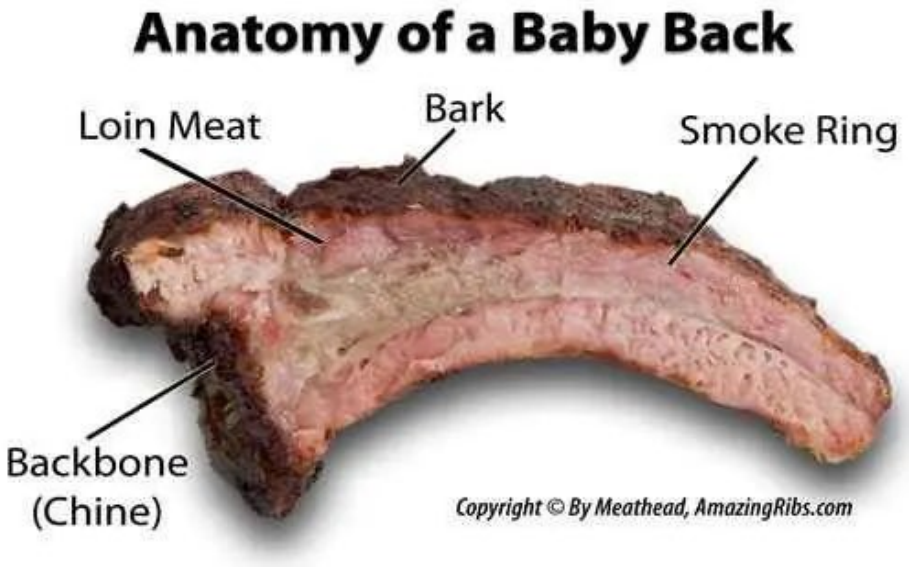
Beef is all pretty much the same color, but slow twitch muscles like flank steak have bigger, richer flavor than some of the lesser used muscles like tenderloin.

Fish live in a practically weightless environment, so their muscles are very different. Fish muscles have very little connective tissue, and that's one reason why fish never gets as tough as pork when cooked. But fish can dry out because there is not much collagen to moisturize the muscle fibers. The color and texture of fish varies depending on the life it leads. Small fish that swim with quick darting motions have mostly fast-twitch muscles and white meat, while flounder, which lives on the sea floor, has delicate flaky flesh. Torpedos like tuna and swordfish swim long distances with slow steady tail movements, so they have have firmer, darker, sometimes even red flesh. For these reasons and others, fish can spoil within days of being caught, while red meats keep much longer.

BROWN IS BEAUTIFUL, BLACK IS BAD

As meat cooks, the most magical transformation that occurs is the *Maillard reaction*. It is named for a French scientist who discovered the phenomenon in the early 1900s. The surface turns brown and crunchy and gets ambrosial in aroma. Who doesn't love the crispy exterior of a slice of roast beef, the browned crust on freshly baked bread? We don't think twice about it, but that brown color on the surface is the mark of hundreds of compounds created when heat starts changing the shape and chemical structure of the amino acids, carbohydrates, and sugars on the surface of the meat. If there is sugar in the rub or marinade it can undergo a flavorful transformation called *caramelization*. Click here to learn more about the **Maillard reaction and caramelization**.

What you don't want is black meat. Let it go too far and it turns to carbon. **Carbonized meat may be unhealthy**.



There's another color you may notice in cooked meat: Pink. Many smoked meats turn bright pink just under the surface. Some people think that pink color means that meat is raw, but not in this case. If the meat were undercooked, the pink would be in the center, not just below the surface. Pink meat near the surface is a common phenomenon called the *smoke ring* and it is caused by gases in smoke preserving the color of myoglobin. Some people think the smoke ring improves taste. That's a myth too. **Click here to read more about the smoke ring and what causes it**.

WHAT HAPPENS WHEN YOU COOK?

Hot air cooks the surface of meat, but it cannot penetrate, so the energy built up on the outside of the meat moves slowly towards the center, eventually cooking the meat throughout. As the internal temp of your meat rises, its color is not the only thing that changes. A number of chemical and physical reactions take place, as the molecular structure of proteins

and fats are altered by heat. Different reactions kick in at different temperatures.

Here's a general guide to temperatures organized from cold to hot. The meat temps shown here are approximate because other variables come into play such as the age of the animal, acidity, salt content, type of heat, humidity, etc. This info has been gathered from multiple sources, including meat science research papers, textbooks, and **Harold McGee's important book, On Food And Cooking**. Click here for a **complete guide to target cooking temperatures**.

25°F (-4°C). Meat freezes. Meat starts to freeze at a lower temperature than water because water in meat is combined with proteins. Water expands as it freezes and sharp-edged crystals form that can rupture cell walls, creating "purge" when the meat is thawed, which is a spilling of liquid, mostly the pink fluid protein called myoglobin. Faster freezing makes smaller crystals, resulting in less purge.

34-39°F (1-4°C). Ideal refrigerator temperature. Water is not frozen, and microbial growth is minimized. You do have **a good refrigerator thermometer don't you**?

41-135°F (5-57°C). The "USDA Danger Zone," in which many pathogenic bacteria grow, sometimes doubling in number in as little as 20 minutes. According to the USDA, cold foods must be stored below 41°F (5°C), and hot foods above 135°F (57°C). **That's why we don't leave meats sitting around to come to room temp**.

60°F (15°C). When chilling cooked meat, liquid gelatin forms a solid gel called aspic. Gelatin happens when connective

tissues that wrap muscle fibers and connect them to bones, called collagen, melt. Yep, it's the same stuff they inject under your skin to hide wrinkles.

95-130°F (35-54°C). Animal fats start to soften and melt.

114°F (46°C). Myofibrillar proteins begin to gel, changing meat texture.

120°F (49°C). Myosin, a protein involved in muscle contraction within fibers, begins to lose its natural structure. It unwinds or unfolds, a process called denaturing. It starts to clump, gets milky, and begins firming up the muscle fibers. Purple meats, called "rare," start turning red. Fish begins to flake, and parasites begin to die.

130°F (54°C). Many pathogenic bacteria begin to die, slowly at first, but as the temp rises, they croak more rapidly. At this temp, it takes more than two hours to pasteurize meat. At 165°F (74°C), it takes just seconds.

130-135°F (54-57°C). Medium rare. Most mammal meats are at optimum tenderness, flavor, juiciness. If you eat your meat well-done, you need to snap out of it.

130-140°F (54-60°C). Fats begin to liquefy, a process called rendering. This is a slow process and can take hours if meat is held at this temp.

140°F (60°C). Connective tissues called collagens begin to contract and squeeze out pink juice from within muscle fibers into the spaces between the fibers and out to the surface. Meat begins to get dry. Myoglobin, the pink protein liquid within muscle cells, denatures rapidly and red or pink

juices begin to turn clear or tan and bead up on the surface. It is not blood!

150°F (66°C). Actin, another protein important to muscle contraction in live animals, begins to denature, making meat tougher and drier still.

150-165°F (66-74°C). This is "**the stall zone**," in which large cuts such as pork butt and beef brisket seem to get stuck for hours when cooked at low temperatures like 225°F (107°C). In this range, moisture evaporates and cools the meat like sweat on an athlete. Inexperienced cooks panic. Eventually, temps start rising again. Whew!

155°F (68°C). Known as "well done," meats are overcooked at this internal temperature. Much moisture has been squeezed out, and fibers have become tough. Bacteria are killed in less than 30 seconds, but spores can survive to much higher temps.

160-165°F (71-74°C). The "instant kill zone." Normal cooking temps kill microbes on the outside of meats rapidly, so solid muscle meats are not likely dangerous since contamination is almost always on the surface. But ground meats and poultry often have bad guys beyond the surface, so you must cook these meats beyond the instant kill zone. That's why the recommended internal temp for ground meats is 160°F (71°C) and for poultry is 165°F (74°C). When you reheat foods, you should take them up to 165°F 75°C).

160-205°F (71-96°C). Tough collagens melt and form luscious gelatin. The process can take hours, so low and slow cooking creates the most gelatin. Dehydrated muscle fibers

begin to fall apart and release from the bones. Meat becomes easy to shred. Even though the fibers have lost a lot of water, melted collagen and fat make the meat succulent.

212°F (100°C). Water boils at sea level. Boiling point declines about 2°F for every 1000′ above sea level.

225°F (107°C). Ideal air temperature for "low & slow" cooking of meats high in connective tissue. It is high enough so water evaporates from the surface to help form the desired crust called "**bark**," but low enough to get the most out of enzymes, collagen melting, and fat rendering.

310°F (154°C). The **Maillard reaction** accelerates surface browning, which is caused by chemical changes in proteins and sugars and results in thousands of delicious new molecules. The Maillard reaction begins at lower temps, but really takes off at 310°F (154°C).

325°F (163°C). Ideal air temperature for cooking chicken and turkey so skin browns and fat renders.

361°F (183°C). Some animal fats begins to smoke.

570-750°F (299-399°C). Primary combustion temperature of hardwood, wherein it smolders and releases large quantities of unburned gases, including microscopic particles called smoke.

600-700°F (316-371°C). Flash point or fire point, the temperature at which smoke from burning fat can burst into flame. Never use water to extinguish burning fat. Smothering it works better.

SALT: THE MAGIC ROCK!

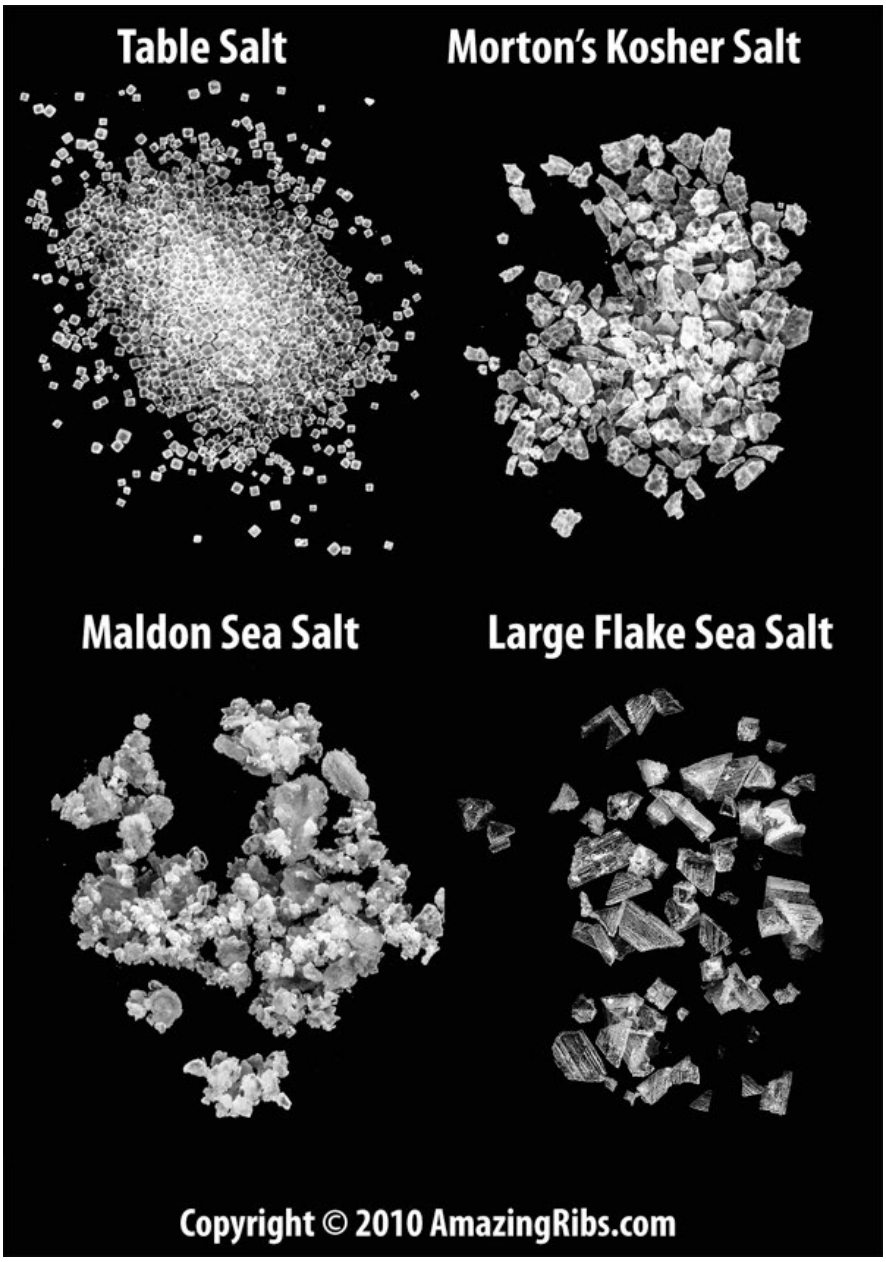
“One thing I like about Argentina, they only cook with salt. That's it.”

— ROBERT DUVALL

If you like your meat juicy, tender, and flavorful, (and who doesn’t?) salting, also called brining, before you cook can improve it on all three fronts.

Salt does several things to the food. First of all, it amps up the taste because salt is a flavor enhancer. It does this without altering the flavor. Sugar, pepper, garlic, all the other spices and herbs change the flavor. But not salt. Salt turns the amp up to 11. And if you do it properly, it doesn't make the food taste salty.

First, it is important to know that all salt is not the same. The below quantities by volume have the same salinity because the grain sizes are different.



- **1 part Table Salt**
- **1 part Morton's Picking Salt**
- **1.3 parts Morton's Coarse Kosher Salt**
- **1.3 parts Windsor Kosher Salt**
- **2.1 parts Maldon Sea Salt**
- **2.3 parts Diamond Crystal Kosher Salt**

For more on the subject of how salt impacts food, read Meathead's article on The Science of Salt. It contains an interactive salt calculator and much more info about the different kinds of salt.

Something else happens because of salt. When meat cooks, a significant amount of water evaporates from the surface and some gets squeezed out from muscle fibers that contract when exposed to heat. This water is called drip loss or purge. Lean cuts like chicken breasts can dry out easily. How do you cook these cuts to safe temperatures without turning them into shoe leather? Surprisingly, salt can help because it helps protein glom onto water.

Salt (NaCl) is made of sodium (Na) and chloride (Cl) ions that carry electrical charges. These ions attack the proteins, causing them to unwind a bit, a process called denaturing. These altered proteins have a greater ability to retain water, so meats that have been pre-salted remain moister throughout the cooking process.

Researchers at *Cooks Illustrated* discovered that a chicken soaked in plain water and another soaked in a brine, a mix of salt and water, each gained about 6% by weight. They cooked both birds, as well as an unsoaked bird straight from the packaging. Weighed after cooking, the unsoaked chicken lost 18% of its original weight, while the chicken soaked it water lost 12% of its original weight, and the brined chicken lost 7% of its weight. Thus, brining counteracts one of the biggest problems of grilling by helping hold moisture that is near the surface, which almost always dries out by the time the center is properly cooked.

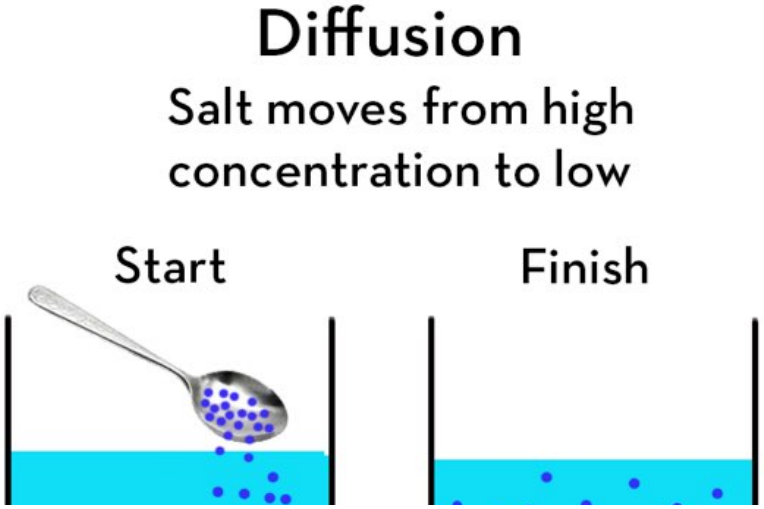
So salting before cooking, brining, has real benefits. And you need less than if you salt after cooking. And the amount of salt is small, not likely a risk to people on salt restricted diets.

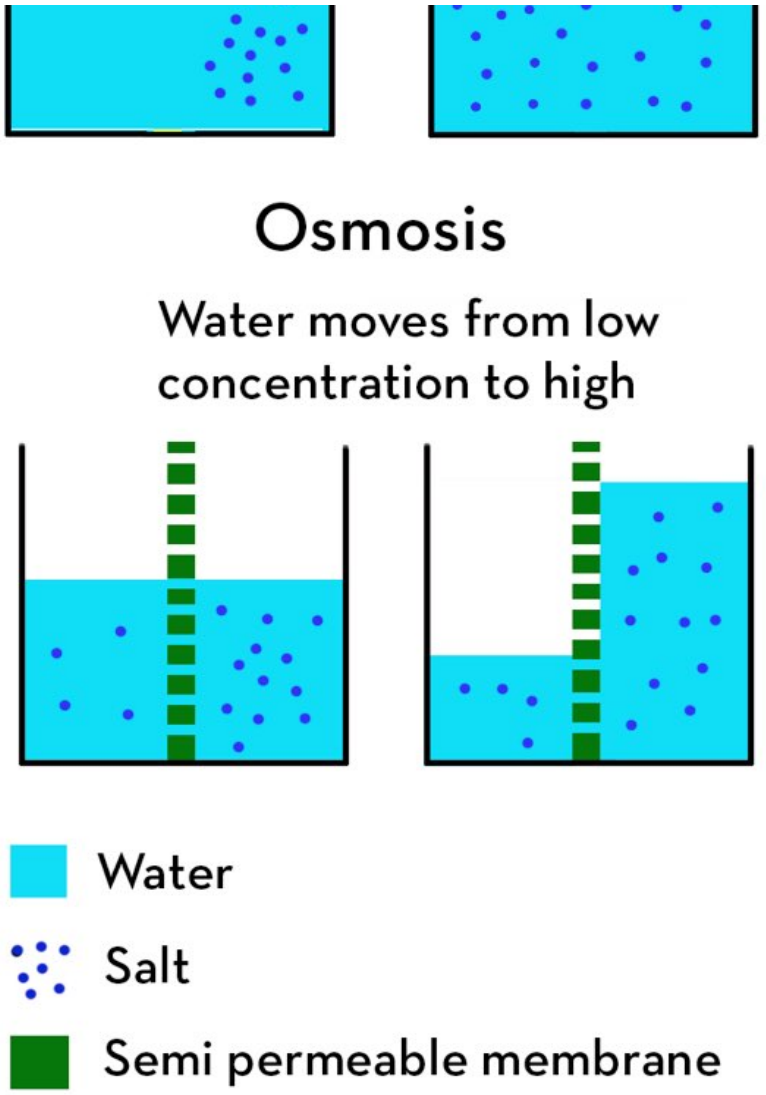
There are four ways to brine: Wet brine, dry brine, brinerade, and injection. Here they all are defined.

WET BRINE

This is the traditional method of salting meat, submerging it in a solution of 5 to 10% salinity (the ocean is about 3.5% salinity). To wet-brine, you need to calculate the amount of water and the amount of salt, and after that you have a potentially large container that must be fit into the fridge.

Cookbooks tell us that salt is pulled out of the brine and into the meat by osmosis. Not true. The process is actually called diffusion. Take a look at this illustration.





When salt is added to a solution, like a piece of chicken which is about 75% water, the salt diffuses or spreads out and seeks equilibrium. Osmosis is when the water moves into salty places through semi-permeable membranes in an attempt to achieve equilibrium.

The problem with wet brining poultry is that it can make the skin soggy and harder to crisp. That's why wet brining works best on boneless, skinless breasts—food that cooks so

quickly that the absorbed moisture doesn't have time to drip out. Chicken thighs, on the other hand, are moist enough from fat that they really don't need wet brines.

If you decide to wet brine, the brine should contain 5 to 10% salt by weight. Here's a simple formula. Add one cup of hot water to a two-cup measuring cup. Then pour in salt, any salt, until the water line reaches 1 ½ cups. That will be *about* 1/2 pound of salt by weight. Stir to dissolve then dump the solution into 1 gallon of cold water. This recipe results in a 6.4% brine regardless of the grain size of the salt.

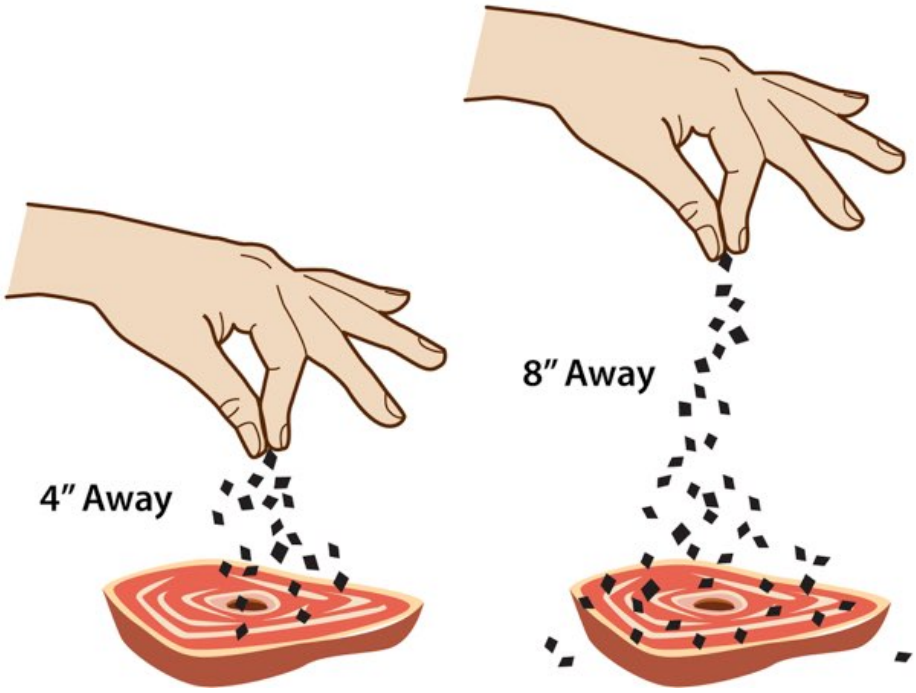
How do we know? Because a unit of salt by weight delivers the same salinity regardless of the grain size. A unit of salt by volume delivers different salinity because large grains have more air between them. In this recipe, the water infiltrates the voids between the grains of salt, compensating for the lower density.

Making brines is also easy with metric weight measurements, which are simple to scale up or down. Since 1 liter water = 1000 grams:

- **6% brine = 1 liter water with 60 grams any salt**
- **5% brine = 1 liter water with 50 grams any salt**
- **4% brine = 1 liter water with 40 grams any salt**

What's the right ratio of meat to brine? In general, soak 1 part meat in 2.5 parts brine. So for a 3 pound chicken (about 1.4 kg) use 3.5 kg of wet brine.

DRY BRINE



Dry brining is simpler and equally effective, plus it takes up less fridge space. Just skip the water. The late, great chef Judy Rodgers of Zuni Cafe. in San Francisco brought the technique of dry-brining into the mainstream, and since discovering her process, which Meathead named dry brining, we almost never wet brine anymore.

To dry brine, you simply salt the meat before cooking. How much salt? Salt tolerance is so personal that it's nearly impossible to give an exact amount.

A good rule of thumb is ½ teaspoon of Morton Coarse Kosher Salt per pound of trimmed meat.

Please note that the saltiness of different types of salt varies significantly due to the size and shape of the grains. Our standard is Morton kosher salt, but if you want to use table salt instead, use half as much. Click here to learn more about salt.

If dry-brining a whole bird or a roast, concentrate more salt on the thicker parts, like the breasts. Bonus: Dry-brining helps poultry skin crisp.

How long do you need to brine? Salt is a slow poke and creeps slowly through the thicket of muscle fibers. How long should the meat be in the brine? Here are some rules of thumb, not precise. Use them for wet or dry brining, and always brine in the refrigerator.

- **½ inch thick meat: about ½ hour**
- **1 inch thick meat: about 1 hour**
- **2 inch thick meat: about 4 hours**
- **3 inch thick meat: about 12 hours**

You want to salt your foods early. If you only have 30 minutes, fine. If you have 2 hours, that's even better. Got 24 hours? That's better still. The good news is that salt

continues to migrate throughout the meat during cooking and does so slightly faster due to the heat.

Leave the meat uncovered on a rack in a pan. This is especially important for poultry because we want the skin to dry out a bit. Just be careful that vegetables and other raw foods do not come in contact with raw meat. And don't rinse it off before cooking. After a few hours most of it has gone in and is well past the surface anyhow.

Whether it's for 30 minutes or 24 hours, pre-salting gives you a better tasting, juicier meat because salt penetrates and helps meat hold onto its juices. Just sprinkle a generous amount of salt all over, about 1/2 teaspoon Morton kosher salt per pound of meat. What about marinating? Forget it. Marinating steaks is a useless technique because marinades don't penetrate the meat much and you end up throwing away most of the flavor when you throw away the marinade.

With dry brining we simply sprinkle plain old salt on the meat a few hours before cooking. No more than you would use at the table.

Sounds simple, but something complex and wonderful happens. You can see it working in the pictures here. In the first picture above the meat has been sprinkled with Morton Coarse Kosher Salt. The salt draws water out of the meat. The water dissolves the salt. See how the meat has become shiny with moisture and the fat has become splotchy?

Then, in the next picture, the meat re-absorbs the moisture (and much of the juices that have leaked out) bringing the salt in with it. Notice how the color of the fat has changed where the salt has soaked in. Here's a slo-mo video of the process.

When it is time to cook there is no need to rinse off the salt. It should all be inside the meat.

Once inside the meat, it doesn't go far. As with wet brining, it stays near the surface, but that's where the moisture is needed because that's where we apply the most heat.

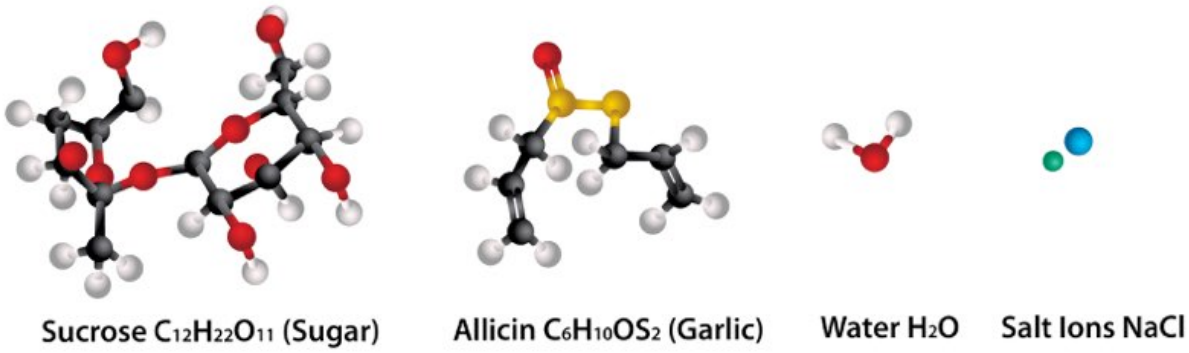
How does this work? The AmazingRibs.com Science Advisor, Prof. Greg Blonder, explains: "Salt is hygroscopic, which is a fancy way to say it absorbs moisture from the environment. Water is a 'V' shaped molecule. It has two positively charged hydrogen atoms on one tip of the V and one negatively charged oxygen on the other making H_2O. This asymmetry creates an electric field, kind of like a small magnet. The polar nature of water is why it's practically a universal solvent.

"When water in the air stumbles in very close to the NaCl crystal, the salt feels the attraction of the water's weak electric field, grabs it, and then breaks apart into a positively

charged sodium ion and a negatively charged chloride ion. When we sprinkle salt on a steak, water molecules, some from the air, but most from the meat, are captured on the surface of the salt crystal, and eventually, accumulate into a pool of briny liquid. Then, as the salty slurry diffuses into the meat, there is less salt on the surface to attract moisture, and the juices return to whence they came. Contrary to popular myth, there is no osmosis or cells breaking."

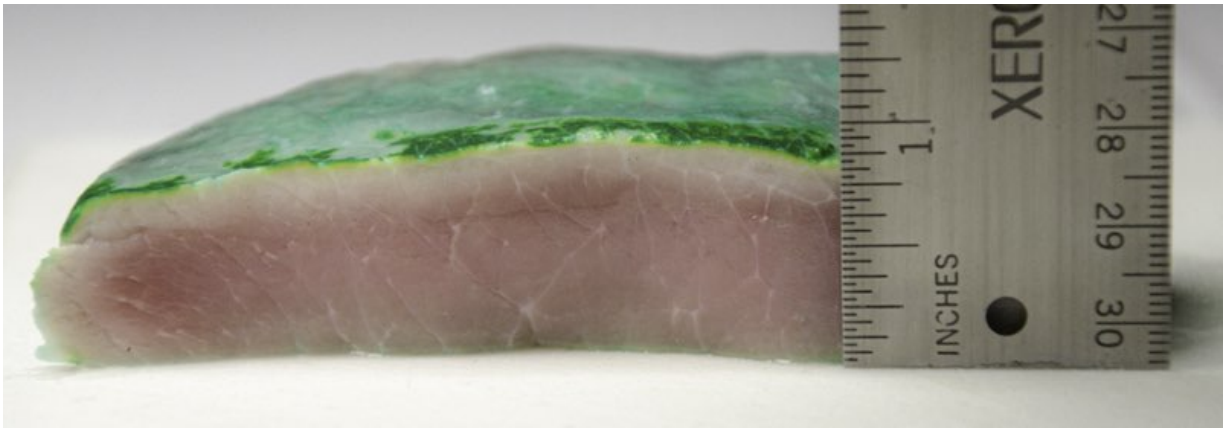
BRINERADES AND THE TRUTH ABOUT MARINADES

This fact always shocks people: Marinades rarely penetrate meat more than 1/8 inch. The molecules are just too large. Salt is only two atoms (NaCl), but sucrose (sugar) is 43 atoms ($C_{12}H_{22}O_{11}$). Likewise, garlic, onion, pepper, and all your other spices and herbs are all too large.



And for sure, oil in a marinade doesn't penetrate because meat is mostly water and oil and water don't mix. Here's a piece of chicken marinated for hours with a typical oil and vinegar marinade with some spices, herbs, salt, and some green food coloring to help us prove the point. As you can

see, there is no penetration (look at the bottom) except for salt, the slightly milky color about ¼ inch below the surface.



If you add salt to your marinade, it will find its way into the food. We call that a brinerade. How to make it? Prepare your marinade (skip the oil) and add the same amount of salt you would if you were making a wet brine.

- **6% brine = 1 liter water with 60 grams any salt**
- **5% brine = 1 liter water with 50 grams any salt**
- **4% brine = 1 liter water with 40 grams any salt**

So why marinate? Because marinades *can flavor the surface*, and if there is acid in the blend, it can tenderize the surface. And if there is salt it can brine. On the downside, a marinade can make poultry skin soggy and prevent it from crisping, and wet surfaces don't brown as well as dry ones. Remember: Brown is beautiful. Here's a way to improve marinades. Add salt to a marinade and it becomes a brinerade. The salt penetrates and helps retain moisture,

sugars help with browning, and everything else flavors the surface.

INJECTING

“I think everybody should have a great Wonderbra. There's so many ways to enhance.”

— CHRISTINA AGUILERA

ou don’t need a Wonderbra to enhance chicken and turkey breasts. Or, for that matter pork butt or beef pectorals. The

Y truth is that rubs, mops, marinating, brining, and sauces can deliver a lot of flavor to the *surface of meat*, but if you really want to get salt or flavor deep into meat, the solution is injecting.

Having an injector also opens up other fun possibilities: stuffing jam into donuts, syrup into ice-cream, and melted butter into squash.

Many meat processors routinely inject meats like turkey, chicken, and pork at the factory. Injecting, or enhancing as food processors call it, is a sure fire way to get the flavor and juiciness down deep. And it is the only way to get fats, herbs, spices and other large molecules deep into meat. You don't have to worry about oversalting, there's no waiting — you can do it at the last minute, you have less waste, no huge containers are needed, there are no refrigerator space problems, and there are few safety issues.

The secret to injecting is to go easy. A good guideline is to shoot for 1 to 2% salt. It is like brining and the salt helps retain moisture as well as enhances flavor. I skip the big flavors like garlic, pepper, and herbs that mask the natural flavor of the meat. I have judged pulled pork and brisket at barbecue competitions where the meat was gushing juice, but it didn't taste like meat. It tasted like apple juice and garlic. I want pork that tastes like pork, beef that tastes like beef, and turkey that tastes like turkey.

The best solutions are salt water, salted butter, or stock. And you don't need much. Muscle is 75% water and it is saturated. There isn't much room in there for more liquid.

Your injection will go in between the muscle fibers and bundles, not within the fibers, so you won't need much. Check out my recipes here.

Many competition cooks like to inject with a product called Fab B Light or Butcher BBQ Brisket Marinade, both moisturizers, tenderizers, and flavor enhancers. Fab B contains hydrolyzed soy protein, vegetable oil, sodium phosphates, monosodium glutamate, autolyzed yeast extract, xanthan gum, disodium inosinate, and guanylate. Butcher contains hydrolyzed vegetable protein (hydrolyzed soy and corn protein and salt, with partially hydrogenated vegetable oil [cottonseed, soybean] added), monosodium glutamate, sodium phosphate, and xanthan gum. Some traditionalists think this is way too Barry Bonds and are repulsed by the idea. The results speak for themselves. They are winning. A lot.

To inject, you need a gizmo, and something to put in it. Click here for our reviews of injection gizmos.

SEASONINGS AND RUBS

Meats are blank canvases to be painted with herbs, spices, and flavorful liquids. Rubs are simply spice blends that are sprinkled or rubbed onto meat before cooking. The rub should fuse onto the meat's surface and enhance the meat, but not overwhelm it.

It is helpful to think of salt as a treatment for the interior of a food, and herbs and spices, as a treatment for the exterior.

Every good barbecue cook should have a signature rub to brag about. In the recipe section of this book (below) there are a few rubs to get you started, then you can start riffing and invent your own. Once you find a rub recipe you like, make a batch and put it in a large spice shaker with a lid. If it clumps or cakes, take a tip from diner waitresses: Take some uncooked rice, place it in the oven at the lowest temperature to dry it out, and add it to the jar to absorb excess moisture.

Compared to salt, spices and herbs are huge molecules that just don't get more than a fraction of an inch past the surface. Think of salt as a treatment for the interior of the meat, and spices and herbs as an exterior treatment, like a sauce. The juices of the meat mix with the herbs and spices and they develop flavor during chemical reactions catalyzed by the heat of the fire. The form the flavorful crust.

Adding sugar to a rub or brinerade has some benefits. It aids in browning, especially at lower temperatures. Be aware:

Sugar burns easily, so you have to be really careful about temperature control and watch the cook very carefully. Also, if you smoke a wet brined meat that had sugar in the brine, it can get a slight hammy taste.

Beware: Some commercial rubs can be half salt. That's some expensive salt! But salt and spices should be applied differently. Because salt penetrates the meat, you need to apply it based on the weight of the meat. Because spices sit on the surface you apply them based on the surface area. For example: A slab of ribs and a hunk of pork shoulder might have the same amount of surface area but the shoulder can weigh 2 to 3 times the ribs and be many times thicker. So you need more salt on the shoulder but the same amount of spices. For this reason (and others) you should consider making your own rubs sans salt. We have rub recipes on AmazingRibs.com for pork, poultry, beef, lamb, seafood, and more. But if you don't want to bother, we have bottled rubs with salt for sale on our site. And yes, there is salt in them. Consumers expect rubs to contain salt and there just isn't room on the label to explain why it should be applied separately. Besides, if we left out the salt we would be priced out of the market.

Before sprinkling on the rub, many cooks like to coat the meat with a layer of mustard, ketchup, mayo, or water as a glue to hold onto the rub. These "slathers" have almost zero impact on flavor because they drip off and dry up during the cook. But they do work as a glue. Clint is partial to mayo because it is mostly oil and fat is flavor. Meathead just wets his hands and pats the meat to moisten it.

Don’t be stingy with the rub. With a spice shaker with large holes, sprinkle on enough to coat the surface but not so much that you can’t see the meat below. About 1 teaspoon for every 4 x 4-inch square is a good rule of thumb to start.

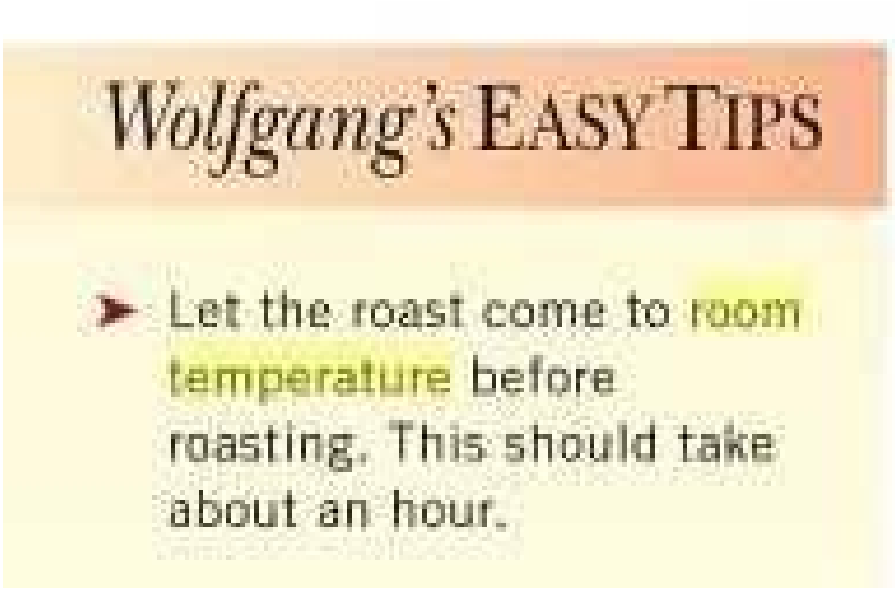
DON'T TRY TO BRING IT TO ROOM TEMPERATURE

A lot of recipes, including steak recipes, say that you should take the meat out of the fridge an hour or two before cooking and "let it come up to room temp."

Here's the theory: Say you want a steak to be served medium rare, about 130°F. If your fridge is 38°F, then the meat must climb 92°F. But if it is room temp, 72°F, then it needs to

climb only 58°F. It will cook faster and there will be less overcooked meat just below the surface.

Here's a picture of a page from a cookbook by Wolfgang Puck, a brilliant and famous TV chef with many restaurants. He says a big old roast should come to room temp in about an hour.



We tried it with a 3/4 inch steak and a really accurate thermocouple. It took just over an hour for the center to come to room temp. A 1 1/2 inch steak took just over two hours for the center to come to room temp. A 4 1/2 pound pork shoulder 3 1/2 inches thick took, are you ready for this, 10 hours! After two hours, the pork shoulder was only 49°F in the center, and after four hours it was only 56°F. Just a bit longer than Chef Puck thinks. Worse, after five hours it began to smell funny.

Why so long? Remember, meat is about 75% water, and most of it is trapped in cell fibers. This makes it a great insulator. So even though the center of a pork butt is only 1 3/4 inches from the surface, it takes 10 hours for the 72°F heat to penetrate. A mere 30 minutes in the oven at 225 to 325°F will warm the meat as much as an hour at a room temp of 72°F.

Now we know that, in theory, all contamination on whole muscle meats like steaks and roasts will be on the surface and not deep into the meat. We understand that within a minute on a hot grill all of the surface microbes will be dead. But we also know that the population can double in 20 minutes at room temp. So the idea of leaving a steak at room temp for more than 30 minutes or so gives us the creeps, especially if there are cracks and pits in which microbes can hide. Especially knowing that some processors use blade tenderizers, tiny knives that cut into the muscle to soften it, but in the process push surface contamination deep into the center. This is a practice that should be banned. Especially

since we will be cooking the steak to only 130°F, a temp that can kill microbes, but it can take hours to kill them all. But more important, over extended periods of time, putrefaction and rancidity set in, the meat starts to smell bad, and the entire flavor profile can change.

And it should go without saying, never leave poultry, burgers, or ground meat at room temp for more than a few minutes. They are susceptible to contamination within the meat and sitting around can really mess up these meats.

Think of letting cold meat sit at room temp as cooking it in a 72°F oven and then moving it to a hotter oven. It will take much longer than if you just put it in the hotter oven to begin with. But the reverse sear theory comes into play. Gentle heating helps ensure that the meat's internal temperature is more even from top to bottom than if it is exposed to high heat right away. But the microbial danger zone is in play as well. At 72°F, microbes are very happy and reproduce with abandon.

A steak cooked reverse sear. In the reverse sear process you are heating gently in a 225°F oven during the initial stage and then searing at very high "Warp 10" temperatures at the end. As we have shown, it can take two hours for a steak to get to room temp and in the oven/grill/pit it gets there in about 15 minutes. It is actually faster to go directly to the grill from the fridge.

A steak seared at Warp 10 first. You are clobbering the meat with a lot of heat and if you want to serve the meat at optimal medium rare, 130°F, you want the interior to remain

relatively cool so it doesn't overcook. Letting the meat come to room temp is actually self-defeating in this scenario. In fact, you are better off cooling it down in the freezer a few minutes.

Also, we now know thanks to the AmazingRibs.com science advisor, Prof. Greg Blonder, smoke sticks better to cold surfaces. So if you want a smokier tasting steak, take it straight from the fridge to the grill.

Here are three beer cans. The one on the right sat on a desk during Blonder's experiment. The one on the left was filled with ice water and placed in a smoker. The one in the middle was empty and placed in the smoker. You can see that the cold wet surface of the one on the left attracted more smoke and thus more flavor.

So in our homes, it's out of the fridge and onto the grill or oven.

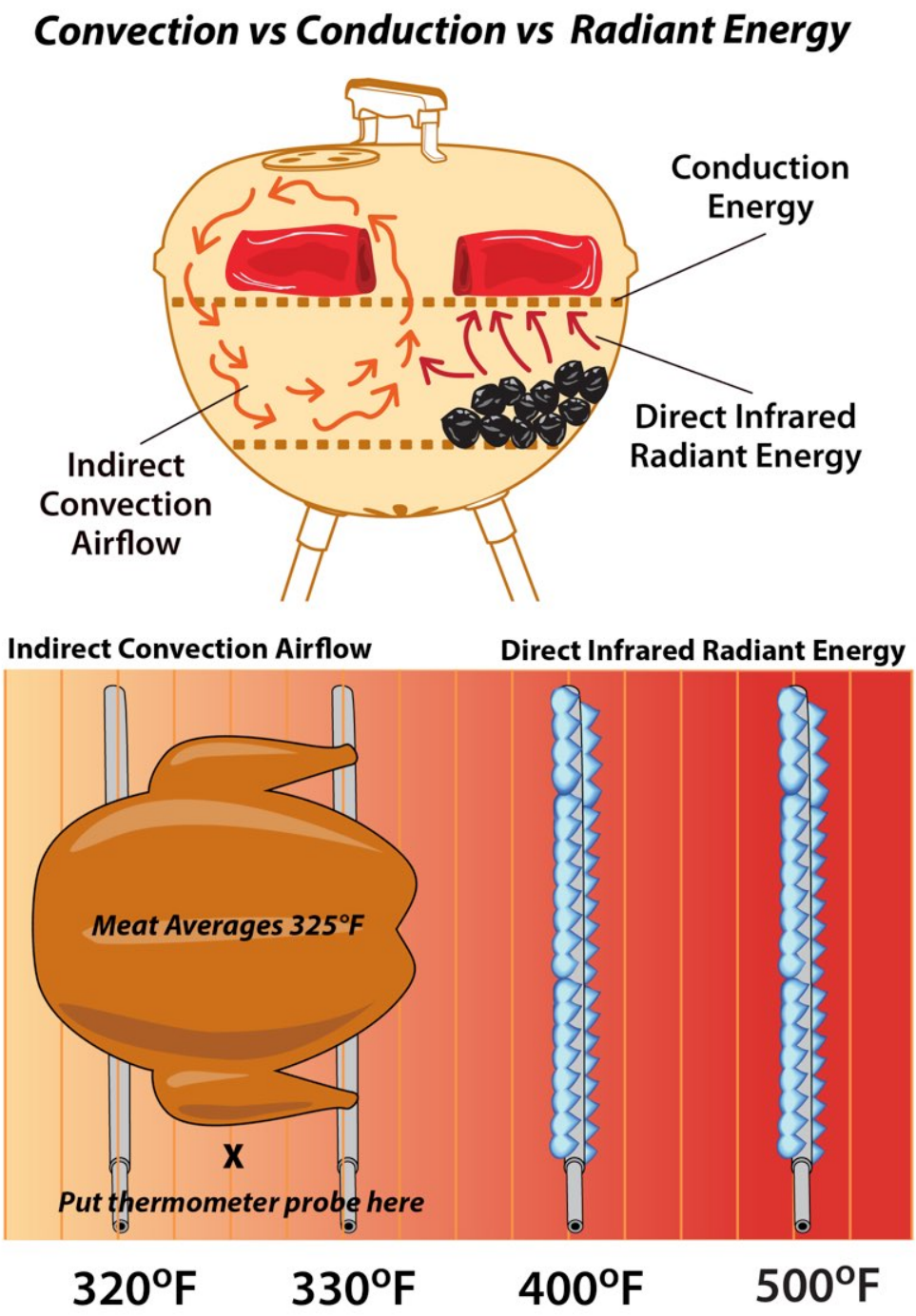
NO RESTING

Do not tent chicken with foil when it is finished cooking because the steam trapped under the foil softens the skin. Resting does not redistribute juices (that's a myth). And while it is resting, see all that steam? It is moisture that you want in the meat! Serve it hot and moist. Don't let it sit around cooling and drying out and overcooking via carryover.

3 TYPES OF ENERGY AND 2-ZONE COOKING

THE 3 TYPES OF ENERGY

Inside a grill there are three types of energy: Conduction, infrared radiation, and convection airflow. It is important to think of these as energy rather than temperature. As an example, turn your indoor oven to 200°F and stick your arm in there. You can do this. It won't burn your hair off. Now touch the metal grates. When you get back from the hospital you will understand that, although the air and the grates were both 200°F, they held and delivered vastly different levels of energy. That's why thermometers are important in measuring energy in a grill but they don't tell the whole story.



Conduction is the most concentrated energy and a basic example is food in contact with hot metal. Conduction from hot metal is what creates grill marks on the food.

Infrared radiation (IR) usually comes from flame or glowing embers directly below the food. This concentrated form of energy packs a wallop and helps sear foods and get dark crusts in a hurry. When you stand in the sun, you are getting bombarded by IR. Yes, there is ultraviolet (UV) that causes sunburn, but there is much less UV that IR. When you place food directly above hot coals or gas flames, you are subjecting it to IR. It is like putting it in the sun.

Both IR and conduction produce enough energy to sear foods. Searing is when food turns brown as a result of two a chemical reactions called the Maillard reaction and caramelization. That brown is flavor.

You can put a thermometer in a grill but it can be misleading because conduction and radiant energy are best measured in calories, not degrees of temperature. That's why we often refer to IR on as Warp 10 rather than measuring the air temp, a dumb Star Trek reference.

Convection airflow is the warm air circulating inside the grill, especially when the lid is down. Convection is not very good at searing. People often brag that their Big Green Avocado can hit 600°F or more, and although that is great for cooking food, it is not as good at browning it as conduction or radiation. Cooking with convection energy is best called roasting.

Once you understand these basics of energy transference you can use them to your advantage. And you thought you left physics behind in high school.

THE IMPORTANCE OF 2-ZONE COOKING

Cooking, indoors or out, is all about controlling energy and the way to do that is with 2-zone cooking. The concept is simple. You divide your grill in half. One side has IR from glowing coals or flame, the other side has no energy source beneath it and is warmed only by convection airflow. With this setup you can move food from gentle low energy that slowly warms the food and doesn't shrink the proteins and squeeze out juices, to rip snorting high energy that can sear the exterior.

For this reason we are not big fans of egg shaped kamados. Most of them are not easily set up in 2 zones.

PART V
TOOLS

You don't need a lot of fancy expensive tools to get started. You can accomplish wonders with a simple kettle grill or a two burner gas grill, a pair of tongs, a brush, and a digital thermometer.

That said, there are some great upgrades and enhancements that come in handy if you can afford them. Here are some of our recommendations.

At AmazingRibs.com we employ the world's only full-time grill and smoker tester and he maintains a database of detailed reviews and ratings of hundreds of cookers.

We also have an electrical engineer outfitted with special equipment to test and rate and review thermometers, the single most important tool for making safe and tasty food.

In addition, our experienced team tests and reviews everything from pizza ovens, to tongs, to spatulas, grill grates, knives, knife sharpeners, gloves, coolers, scales, pots and pans, kitchen equipment, all manner of accessories, and every year we pull together a list of the best new products and a great gift guide.

Click here to check out our Product Reviews section.

CHARCOAL GRILLS

Charcoal grills are the most versatile all-purpose outdoor cooker. When set up properly, the good ones can do both high energy infrared searing and low energy convection air roasting, as well as smoking. Their main advantages are that charcoal generates more energy than most gas burners and you can capture more smoke because the best charcoal grills allow you to control airflow. Gas grills have large permanently open vents so you can't easily contain the smoke, but they can do a respectable job. You just need to burn through a lot more wood.

Here is a picture of two slabs of ribs, one cooked on charcoal, one on gas. You can see the difference in color caused by the differences in the smoke.

To set up your grill for 2-zone cooking, simply pile lit charcoal briquets on one side of your grill's charcoal grate to create a hot (direct) infrared heat zone and a cool (indirect) convection airflow zone. You can also add a water/drip pan on the empty side of the charcoal grate and/or a second one directly above the charcoal on the main cooking grate if you wish. If you add water pan(s) you are adding moisture to the atmosphere, and if the water pan is above the heat source you are further protecting the meat from direct heat; the water absorbs heat, helping to keep the temperature down but does not steam the meat which will make it mushy. If you keep the oven temp at 225°F, the water should not boil because the surface area will allow evaporation that will cool the water keeping it below 212°F. Hard to believe, but true. If the water is boiling, you are running hot.

Intake dampers (on the bottom) are more effective at controlling the temperature than the exhaust dampers at the top of the grill because they reduce the supply of oxygen to the coals. So monkey with the intake dampers to control temperatures. Take your time getting the temperature right and try to maintain it throughout the cooking process.

Another reason for water pans is because water condenses on the relatively cool meat and keeps it cool, slowing the cook. Furthermore, smoke particles stick to the wet surface better than dry surfaces.

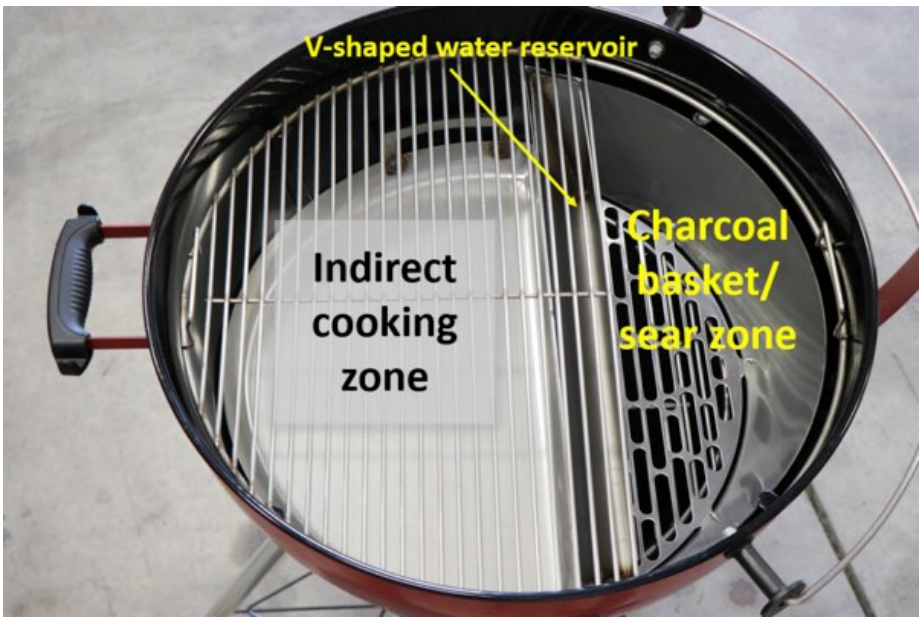
Cooking at 225°F will allow the meat to roast low and slow, liquefying the collagen in connective tissues and melting fats without getting the proteins knotted in a bunch. It's a magic temperature that creates silky texture, adds moisture, and

keeps the meat tender. If you can't hit 225°F, get as close as you can. Practice without food. Click here for more about how to calibrate your grill.

While lump charcoal is an option, we prefer briquets because they give us more control and we are control freaks (read our article on charcoal to see details). Absolutely do not use the instant igniting stuff that has solvent in it.

Chimney starters are by far the best way to start charcoal, especially for long slow cooking where the smell of the solvent in charcoal starter fluid can ruin the taste of the meat. Read how to start a charcoal fire here.

If you are using a charcoal grill or smoker, wait until the coals are white. The emit less smoke and the smoke from charcoal is not as good tasting as the smoke from wood. Then add about four ounces of dry hardwood or fruitwood to the fuel for at least the first hour of cooking. Do not overdo it on the wood as too much can result in a bitter and overpowering smoke flavor in the end product. If the result isn't smoky enough, add more the next time you cook.



If you are shopping for a grill that can also smoke, a great inexpensive solution is the good old fashioned Kettle. A stripped down model of the venerable Weber Kettle is still less than $200, and with the addition of a device called the Slow 'N Sear (above) for about another $100, you get a system that can both grill and smoke superbly, albeit with limited capacity. On one side it corrals all the coals behind a water reservoir; the food goes on the indirect side to smoke-roast at the perfect temperature. When you want to sizzle on the sauce (or sear a steak) you place it right above the glowing coals.

Another option are the Slow 'N Sear Kettle Grills. Similar to the Weber, it has several modernizations not the least of which, the two-zone insert is included. It has four legs, a thermometer port, and a side shelf.

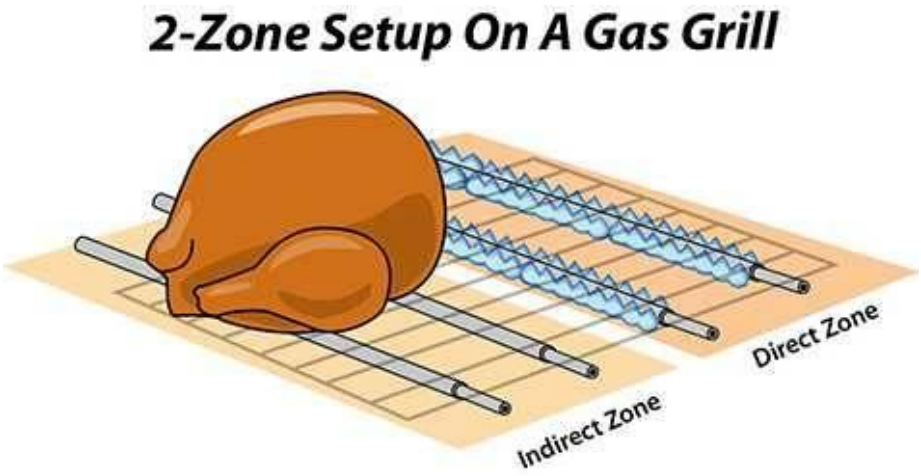
One of our favorite charcoal grills is the Portable Kitchen 360 (a.k.a. PK 360) for about $800 (above). Its rectangular shape makes it easy to set up in 2 zones and the coals are close to the cooking grate, making it superb for searing steaks.

Our all-time favorite is the Hasty Bake 357 (above) for about $3,600. It has all the bells and whistles and best of all, you can raise and lower the charcoal grate to control heat. Hasty Bake makes less expensive models you should consider if you fainted when you saw that number.

Click here to see our favorite charcoal grills.

GAS GRILLS

If you are using a gas grill you can easily create a 2-zone set-up and we think 2-zone is crucial for almost anything you are grilling. Most gas grills come with more than one burner nowadays because the concept of indirect cooking is becoming better known. When shopping for a gas grill, the more burners the better. Two is the minimum, three is better, four is best. You will appreciate the real estate and the ability to control temperature. Since law requires gas grills to have open vents, none of them allow you to control airflow, so there isn't a real significant difference between gas grills when it comes to smoking.

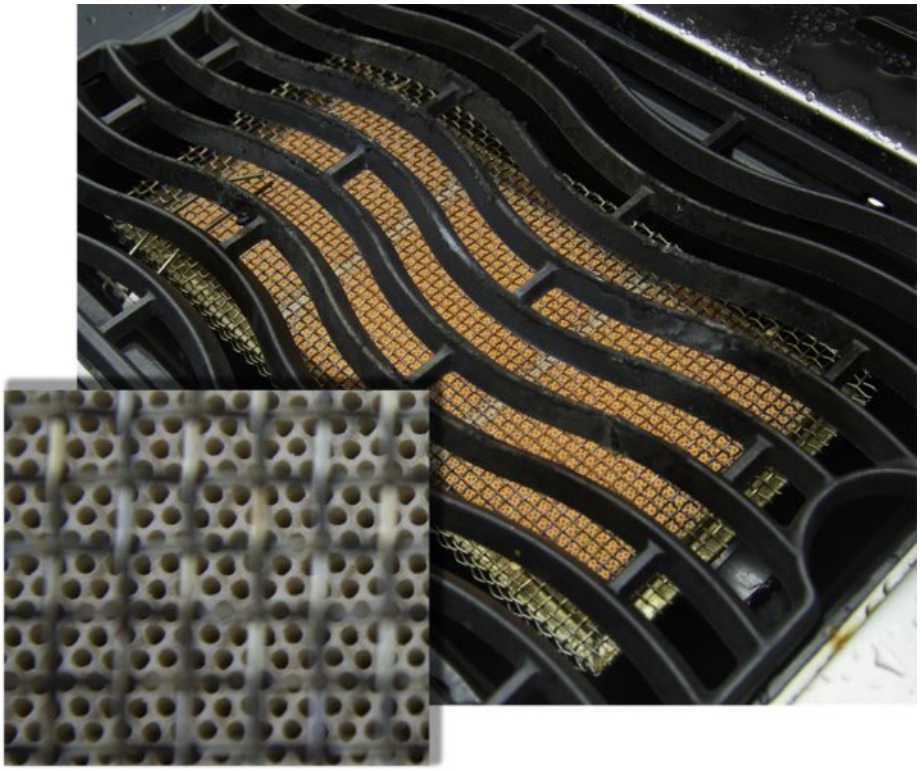


If you have a grill with only one burner, or if you have more meat than will fit in the indirect zone, try this technique. Put the wood as close to the flame as possible.

Regardless of how many burners you have, if you are going to smoke, put a pan of water between the burner and the food. The water absorbs heat and helps minimize fluctuations in temperature. The moisture also mixes with the smoke and propane combustion gases and creates flavors you cannot get with smoke alone. It also condenses on the meat cooling it and making a sticky surface for smoke to stick to.

The big difference among gas grills is their ability to sear at high temperatures. Unfortunately, most gassers just don’t generate enough IR to do a great job of searing. A few come with sear burner tubes, but even they are usually anemic.

The best sear burners are made of ceramic honeycombs like this one:



For a propane grill, make sure you always have a spare tank. Don't risk running out. Natural gas grills never run out because they are connected to the household gas supply.

Now that you have set up your grill for indirect cooking, throw some wood on the flames or the deflector right above the flames, place the meat as far from the heat source as possible, close the lid, and let the convection airflow, smoke, and seasoning do their jobs!

Click here for a look at our top rated gas grills.

SMOKERS

Steak likes a little smoke but not a lot. So usually we don't smoke them.

But if you want to, the best way to smoke is a dedicated smoker, but it is not hard to convince a charcoal or gas grill to do it very well, thank you. There are many different types of smokers ranging from about $200 to $20,000+. Selecting one is a whole 'nother book so let us refer you to some articles and videos on AmazingRibs.com, and our searchable database of hundreds of smokers tested by the world's only full-time grill and smoker tester, our very own Max Good. (We don't sell anything, but we do link you to places to buy.)

Most smokers cook food entirely with indirect convection airflow. The fire is away from the food. A few smokers use direct heat but the coals are kept at a distance.

There are many different types of smokers ranging from about $200 to $20,000+. Selecting one is a whole other book so let us refer you to some articles and videos on AmazingRibs.com, and our searchable database of hundreds of smokers tested by the world's only full-time grill and

smoker tester, our very own Max Good. (We don’t sell anything, but we do link you to places to buy.)

If you are just getting started and have a limited budget, we recommend the charcoal burning Pit Barrel Cooker (above) for about $350 delivered to your door fully assembled and ready to go.

The 18 inch Weber Smokey Mountain (above) is another great choice for about $330.

An excellent choice, but a bit more expensive, would be one of the many high-tech pellet smokers with precision digital temperature controls. They burn small pure sawdust pellets about the diameter of a pencil and function as thermostatically controlled outdoor ovens with smoke. Just set the temperature and walk away.

Small portable pellet smokers start at about $400, and full-size smokers about the size of a gas grill start at about $700. We gave high marks to the Grilla Silverbac Alpha (below).

Here's a list of all our top-rated pellet smoker models.

For the very best smoke flavor, we are partial to log burners. The good ones are not cheap. They start at about $800, so please don't be suckered into buying the cheap offset smokers at the big box hardware stores. Beware, log burners require constant tending and skill. Beginners will make mistakes and ruin a few meals. Below is a Lang reverse-flow offset smoker which is highly recommended. Click here to learn more about offset smokers.

The odd looking thing below is a Karubecue. It employs a number of brilliant innovations that make it the best

backyard log burner on the market. It costs about $1,440 at press time.

There are gas smokers and we like them because you can set em and forget em. They don't require the vigilance that charcoal and log burners demand. And they are inexpensive. Alas, some make temp control difficult, so be sure to check our reviews before buying.

There are electric smokers, but the wood smolders and does not burn in them. Burning wood produces better tasting smoke than smoldering wood so for that reason we are not fans of electric smokers.

Looking for a new outdoor cooking rig? Here's a web page with a lot of info, videos, and links on how to select a grill or smoker.

ABOUT WOOD

Then there is smoke, which we think of as a spice or flavoring element. Some of it comes from charcoal (gas has no flavor), some of it comes from vaporized drippings of juices, fat, and spices. But the best smoke flavor comes from burning wood.

Charcoal is not a very good source of smoke. When you first light charcoal it produces an acrid smoke. When it is fully ignited and has a thin coat of white ash, charcoal produces very little smoke. That is when you add real wood.

The best smoker is a dedicated smoker, but it is not hard to convince a charcoal or gas grill to do it very well, thank you. All you need to do is use a 2-zone set-up and throw hardwood, fruitwood, or nutwood on the flames and let it burn. That's right, let it catch fire and burn. You won't see a lot of smoke, but that's what you want. The truth is that billowing white smoke from smoldering wood does not taste as good as "blue smoke," smoke whose particles are so small they don't diffract much light, so the smoke is thin, pale blue, and practically invisible. Those flames you see are combusting impurities that impart undesirable flavors. So let it burn!

Never use any kind of pine or sappy, soft wood unless you want meat that tastes like turpentine. Never use construction lumber because it is often treated with poisonous chemicals to discourage rot and termites.

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We don't care what you have read, there is no need to soak wood before adding it. First of all, wood doesn't absorb much water. That's why they build boats from wood! We have soaked wood and cut it open and the interior is bone dry.

There is only a little moisture captured on the surface. When we weigh wood soaked overnight it gains less than 5% of its original weight.

Secondly, all that billowy white smoke from smoked wood is really steam because the wood cannot combust until the water on the surface of the wood evaporates at 212°F. Then the wood can go up in temperature to 500°F+ where it can combust. At that point, it burns with a bright blue and orange flame, making clean blue smoke with few impurities.

Don’t obsess over which wood to use . The differences are subtle and you should concentrate first on getting quality meat, trimming it, salting it, rubbing it, temperature control, and sauce management. Wood theory is a book length topic unto itself, so if you want to know more and learn why we tell you not to obsess over wood types, click here to learn about combustion and the different kinds of wood and smoke.

Do not overdo it on the wood as too much can result in an overpowering ash flavor in your food. Go easy the first few cooks and add more as you gain experience.

On charcoal or gas cookers, start with 4 to 8 ounces by weight of chunks, chips, or pellets for a mild smoke flavor that complements the meat and seasoning without overwhelming. No matter how much food you are cooking, 8 ounces should be enough. You don't have to be precise, just measure it in some fashion so you have a baseline for your next cook. Then you can add or subtract if you wish.

THE ABCS OF FIRE EXTINGUISHERS

Always keep a fire extinguisher near your grill, smoker, and in your kitchen. Water will only spread grease fires. The best extinguisher is rated ABC.

- **Class A** fire extinguishers are for paper, wood, cardboard, and most plastics.
- **Class B** fire extinguishers are for flammable liquids such as gasoline, kerosene, oil, and grease.
- **Class C** fire extinguishers are for electrical equipment and wiring.
- **Class D** fire extinguishers are for combustible metals including magnesium, titanium, potassium, sodium, and some other chemicals.
- **Class ABC** fire extinguishers can handle most everything except some class D materials. This is the one you want. Beware, they contain a yellow powder that can damage electrical devices.

COOK WITH A THERMOMETER, NOT A CLOCK

COOK WITH A THERMOMETER, NOT A CLOCK

Different cuts of meat vary significantly in tenderness, fat content, and collagen content. Some are best cooked hot and fast, some better cooked low and slow, and some must be cooked with a combination of hot and slow to reach their optimal taste and texture. Click here to read an article on the subject of cooking temps and info on how to get this food temperature guide with more than 80 benchmark temperatures.

This is why cooking times in recipes are guesstimates at best. Think about the absurdity of a recipe that says, “cook the steak for six minutes on the first side and then four minutes on the second side.” How long it takes to cook depends on how hot the air is, how hot the cooking surface is, how thick the meat is, and your target temp.

Depending on the grill, cooking steaks could take twice as long or half as long. Thick steaks take more time, and if you want them rare, they'll take less time than in if you want them well done. Click here for more on cooking times and what controls them.

You cannot tell if meat is safe or cooked to the proper temp by looking at it. When you cut into meat to look at it, it can change in a few minutes after it has been exposed to oxygen. Compounds in marinades and brines can impact color. Sometimes vegetables in the grill can produce gases that alter meat color. It has long been thought that when chicken juices run clear the meat is safe, but modern chicken farming has changed that. Click here to read how we bust the myth of clear chicken juices.

The truth is, meat can go from succulent to sucky in just a few minutes. The only way to be sure about doneness is to use a digital thermometer. Overcook meat and you've wasted your money. Undercook it, and you could give someone a tummy ache or much worse. That is why you ALWAYS cook with a thermometer, not a clock. This is the 21st century. The digital age. Stop using 19th century technology. Ditch your dial telephone and your dial thermometer.


DIGITAL THERMOMETER
224.9
50F Low


ThermoWorks
OL
259.8
100F Low


50F Low


60F High
BRINKMANN
237
REMOTE RECEIVER


45F Low
BEEF
235
344


236
REMOTE RECEIVER
BBQ
56F Low


226
REMOTE RECEIVER
BBQ
25F Low


ThermoWorks
602
TEL-TRU
40F High

And while you are at it, get a digital oven thermometer. The cheap dial thermometer that came on your grill or smoker is probably off by 25 to 50°F like the one above. I have seen them off by 100°F!

Click this link for a buying guide to thermometers with more than 150 test results from our on-staff electrical engineer.

As the internal temp of meat climbs, more water gets squeezed out, and the meat becomes drier. In general, most meats are juiciest when cooked to medium rare, 130 to 135°F internal temperature.

But that's not hot enough for safety in some meats. Ground meats and poultry are health risks at those temps. Ground meats need to be cooked to 160°F, and poultry needs to go to 165°F to kill pathogenic bacteria. But there's more to the story than that. You can actually serve these meats at lower temps if you know the rules. **Read my article on meat temperatures**.

Meats with a lot of connective tissue such as beef and pork ribs, pork shoulder, and beef brisket, are too tough at these lower temps. They need to go up to 200 to 205°F in order to gelatinize collagens and melt fats. That's well past well done, and yes, water is lost, but the gelatin and melted fats lube the meat and make it taste tender and juicy.

Be aware that if you let meat sit around after you remove it from the heat, the heat built up in the outer layers will push down to the center and overcook the meat, a process called **carryover cooking**. The good news is that **resting meat**

is probably not necessary, despite what all the TV chefs say. For more about ideal serving temps, **read my detailed Food Temperature Guide**, which has a handy printout for your fridge.

A good digital thermometer is the most important tool you can own. As for monitoring and maintaining the desired grill/smoker temperature, the built-in thermometers are generally worthless. They are called bi-metal thermometers and most are slow and inaccurate. To become master of your instrument, you need a good *digital* oven thermometer to measure the air temp.

You also want a thermometer that can measure food temperature in 5 seconds or less. Here is the Thermoworks Dot for about $40, the best all-purpose thermometer going for the price. It can be clipped to the cooking grates to measure oven air temperature, inserted into meat to provide constant readings throughout a long cook, or inserted in meat for rapid spot readings. For other options, go to AmazingRibs.com and click on Ratings & Reviews and then thermometers. We have an electrical engineer equipped with

special equipment to measure accuracy and speed. He has tested and reviewed hundreds.

They range from $20 to $200 and can have as many a six probes. Several have two monitors, one attached to a probe on a cable like the Dot And the other that it talks to with wireless tech so you can carry a monitor in your pocket while you cut the lawn or watch the game. There are even thermostats that can control the temperature of your charcoal grill.

SOUS VIDE QUE

The ultimate solution to preventing dry meat is cooking with a technique called *sous vide* and then finishing it on the grill. We call this *sous vide que* and we discuss this marvelous method, with videos on this page on our website. For a Deep Dive on the subject, we have written an ebook called "Sous Vide Que Made Easy: How To Deliciously Marry The Grill And Smoker With Sous Vide" .

When cooking sous vide you first salt the meat then put it in a plastic bag, squeeze the air out of the bag, and submerge it in water that is heated with an “immersion circulator.” It can hold the temperature precisely and consistently at, let’s say, 131°F for red meats and 154°F for poultry. You wait for the center of the meat to reach the target temp, and hold it there long enough to make it tender and pasteurized, about two hours. It is impossible to overcook this way.

The problem with sous vide is that, although the meat comes out tender and juicy, red meat surface is ugly grey and poultry the skin is flabby and bland. That's where the "Que" comes in. You finish it by adding the rub and placing the meat over a hot grill for a few minutes to create the Maillard reaction crust and flavors of browning. Another option after the sous vide step is to put the meat in a smoker at 225-325°F for 30 minutes. The results are extremely tender and tasty.

ADDITIONAL TOOLS

In addition to the smoker/grill and fuel, there are a few other tools that you will want to have on hand before you start cooking, including:

TONGS

These 12-inch tongs from OXO make it simple to move chicken parts around your grill. They also lock closed for easy storage.

A SILICONE SAUCE BRUSH

When it comes to saucing, bristle brushes are really hard to clean and can harbor pathogenic bacteria. Throw them out and get a good silicone sauce brush. They are easy to clean, they're dishwasher safe, and they load up with a lot of sauce.

A GOOD CUTTING BOARD

We are partial to plastic cutting boards because they can be cleaned in the dishwasher and if they get gouged you can sand them smooth. This double sided one from OXO has grips so it doesn't slide around on the counter and gutters along the edges to capture juices. It is under $20.

A FILLET KNIFE

These cheapo filleting knives from Rapala are beloved by fishermen. They have thin flexible blades with a dangerously sharp edge and a wicked sharp tip and soft handle. The 9-inch model costs less than $30. It's great for separating ribs, slicing tomatoes, removing silverskin/membrane on meat, boning, slicing the ribs and seeds out of hot peppers, and, of course, filleting. It is not strong enough for cutting through bone, but there is nothing better for cutting meat *off* the bone. When it is dirty, it goes in the dishwasher. When it's

dull, we sharpen it. When we can't get it as sharp as new, we get a new one.

A RIB HOLDER

If you are hosting Fourth of July and have a crowd coming and limited grill space, a wire rib holder like this one for less than $20 can handle five slabs. Just beware, because the slabs are close together airflow and smoke-flow are hampered, so cooking time can be significantly longer.

18-INCH WIDE HEAVY DUTY ALUMINUM FOIL

Essential if you opt for the Texas crutch. We prefer it to butcher paper because it is easier to get a good seal.

A LOUNGE CHAIR

Once you settle into a La Fuma lounge chair or one of its imitators, you will not want to get up.

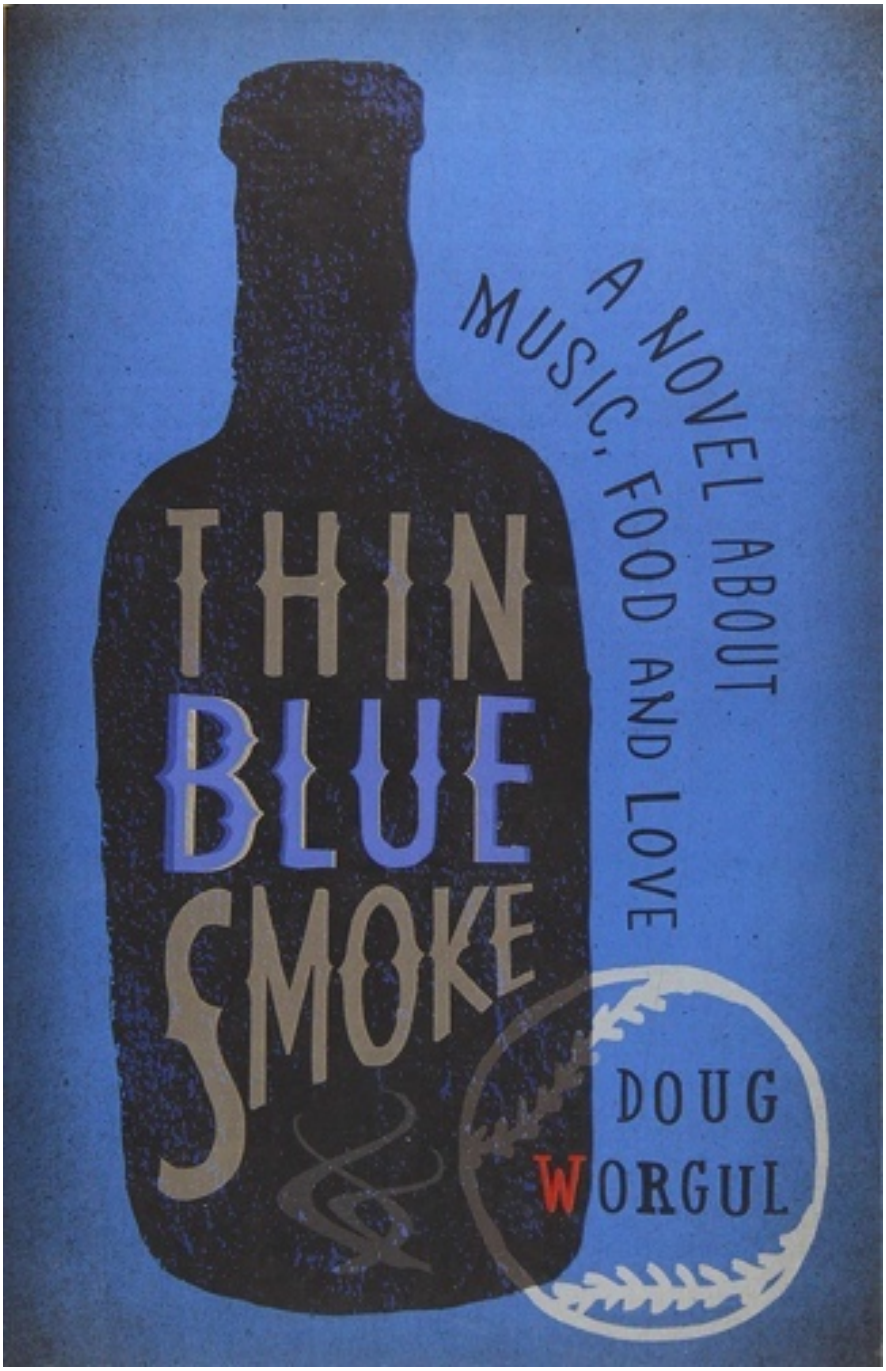
A SIX-PACK OF BEER

For the cook, not the meat.

A GOOD BOOK

A darn good read, *Thin Blue Smoke: A Novel About Music, Food, And Love* by Doug Worgul is well worth your attention. And not just because it has barbecue at its core. *Thin Blue Smoke* comes to life with some fascinating characters whose stories intersect with those of the main character, LaVerne Williams, a former major league baseball player who has an attitude, a rap sheet, and a Kansas City barbecue joint called "Smoke Meat." The writer, Doug Worgul, has a day job as marketing director for one of the nation's best barbecue joints, Joe's Kansas City Bar-B-Que in KC, so this storyteller knows the turf. In Worgul's hands, the travails of a small-

time black restaurateur in the barbecue capital of the world ring true. Of course, Worgul's tale also weaves in music, whiskey, religion, profanity, love, lies, and laughter.



TUNES

Start with the great Louis Armstrong's "Struttin With Some Barbecue" (it's not really about barbecue, click here to read the backstory). To get you in the groove, we have a playlist of our favorite food tunes.

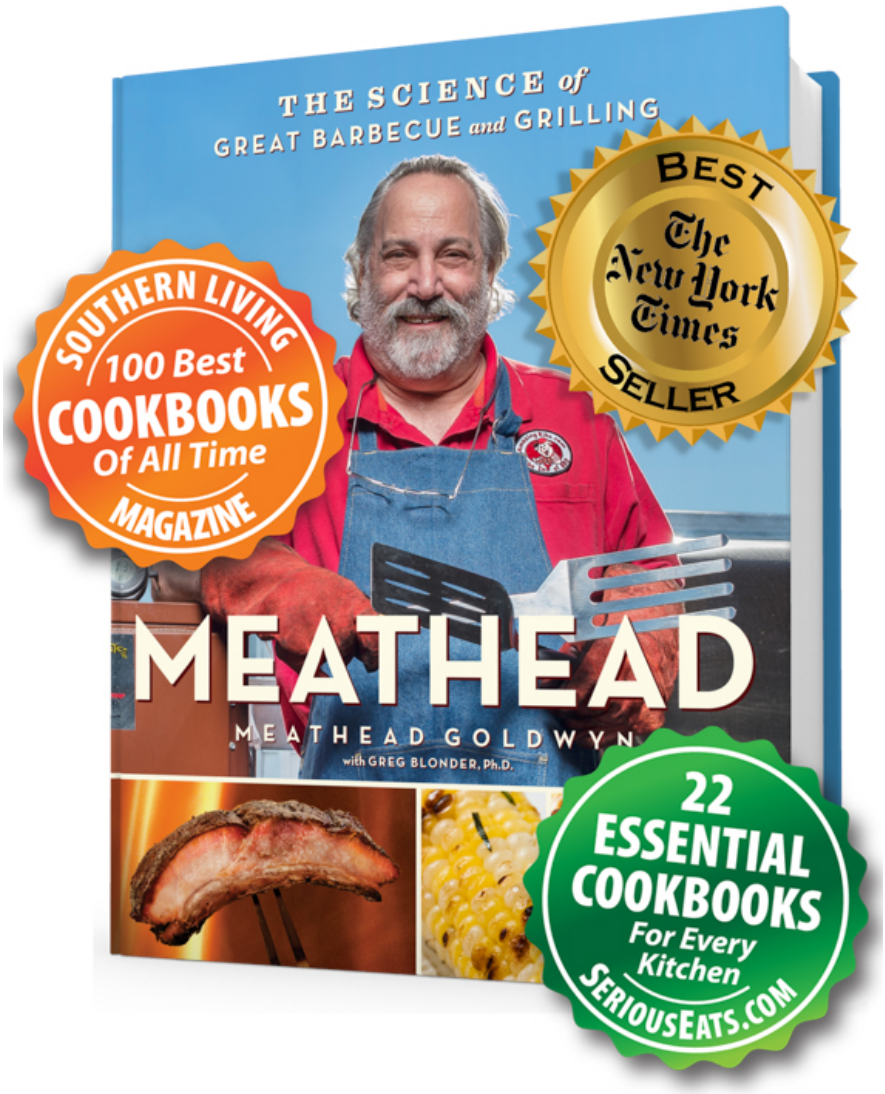
PART VI
THE MEATHEAD METHOD

“Always remember, cooking for others is an act of love, and the most important part of the meal is not what's on the plate, but who's in the chairs.”

— *MEATHEAD*

Just what the heck is the Meathead Method?

It is the melding of science and art to create deliciousness and to nourish the soul as well as the body. It is a suite of science-based techniques that form the toolbox with which you can elevate your cooking, and hopefully gain creative inspiration.



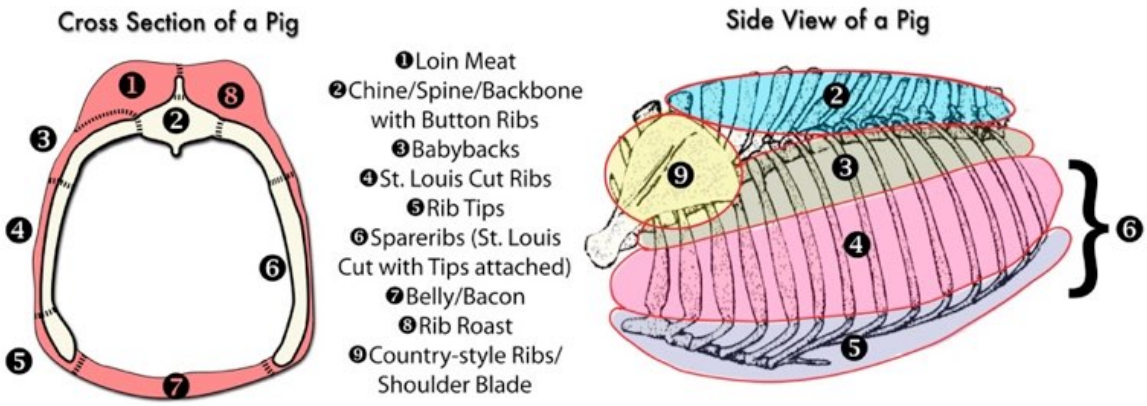
I am honored that my hardbound book, ***Meathead, The Science Of Great Barbecue And Grilling***, made a lot of best cookbook lists including "The 100 Best Cookbooks of All Time" by Southern Living and that many cooks now employ my concepts. The reason for the accolades is simple, for years I have been questioning conventional wisdom and testing what I call "Old Husbands' Tales." When the lessons I have learned are woven together they comprise a comprehensive philosophy and approach to culinary arts

that have form The Meathead Method. I believe the Meathead Method can change your life like it changed mine.

I have written about the Meathead Method on Meathead's AmazingRibs.com, but the web is not the best learning environment. A morsel of info here, click, jump, a snack there, click, jump a crumb next. A book, or in this case, two books, with a beginning, middle, and end is a far better way to get the big picture.

I am currently writing my next hardbound book not surprisingly named ***The Meathead Method, Barbecue Science Meets Culinary Art.*** I am very pleased with its progress. Be sure to subscribe to my email newsletter to hear about it when it is published.

THE LANGUAGE OF PORK RIBS



Modern butchers have attempted to standardize the names of the many meat cuts and, in fact, there is even a book that is their bible, the North American Meat Institute's *Meat Buyer's Guide*. But standardization is a recent effort, and meat cuts vary around the world because of local traditions, and many cuts are still known by their older or regional names. Thoroughly confusing.

SLAB (A.K.A. RACK)

In the US and Canada, there are four popular cuts from the rib section of a hog: Babybacks, spareribs, St. Louis Cut, and rib tips. But wait! There's more! Here's a guide to the various types of ribs.

A slab or rack is a row of rib bones held together by muscle meat, fat, cartilage, and connective tissue. The meat is both between the bones and on top of them. Not much meat on the back. A slab is usually 10 to 13 bones, depending on how it is trimmed, and a "cheater rack" is only nine bones.

BABYBACK RIBS

No, these do not come from baby pigs; the name is derived from the fact that they are shorter than spareribs (defined below). Nestled beneath the loin muscle and connected to the hog's backbone, with loin meat on top, babybacks are the most tender and leanest pork rib option.

A typical full slab of babybacks has 11 to 13 bones and weighs roughly 2 pounds, about half of which is bone. The slab is tapered at one end, with the shortest bones only about 3 inches long and the longest about 6 inches. But their most identifiable quality is the dramatic curvature of the bones. Here are the required six bones in the standard turn-in box for a Kansas City Barbeque Society (KCBS) competition.

Some can have up to 3/4 inch of lean loin meat on the top depending on how generous the butcher feels. If you buy a rib roast (see below) you can remove the ribs yourself and control how much loin meat is on them.

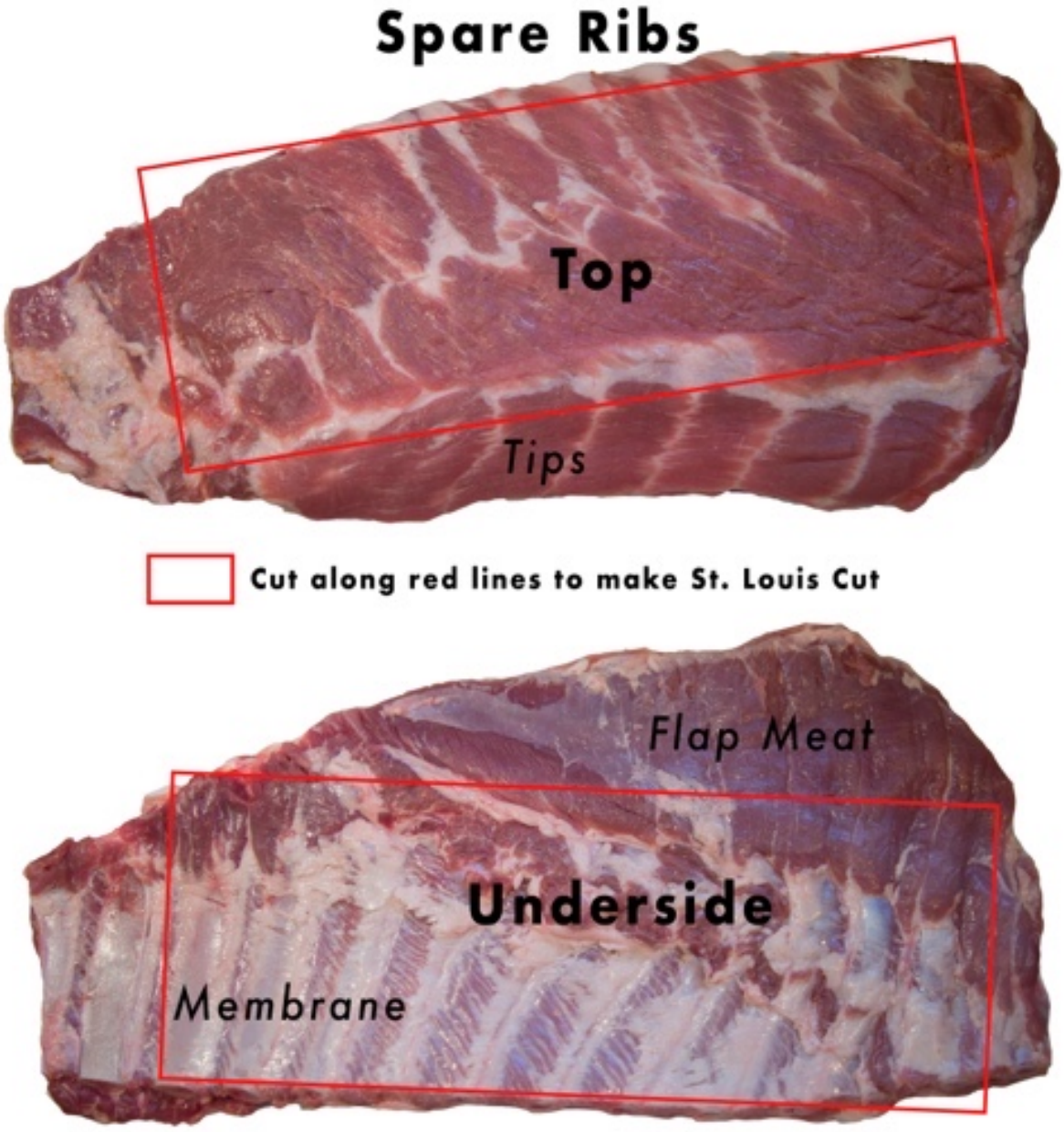
Because the bones are close together they have less tough connective tissue than spareribs or St. Louis cut ribs; thus, they cook a bit faster. A standard 2- to 3-pound slab can serve two people or one really hungry big man.

If you plan to cook in the huge “World Championship Barbecue Cooking Contest at Memphis In May” you should master babybacks, the cut of choice in Memphis.

Boneless Babyback Ribs

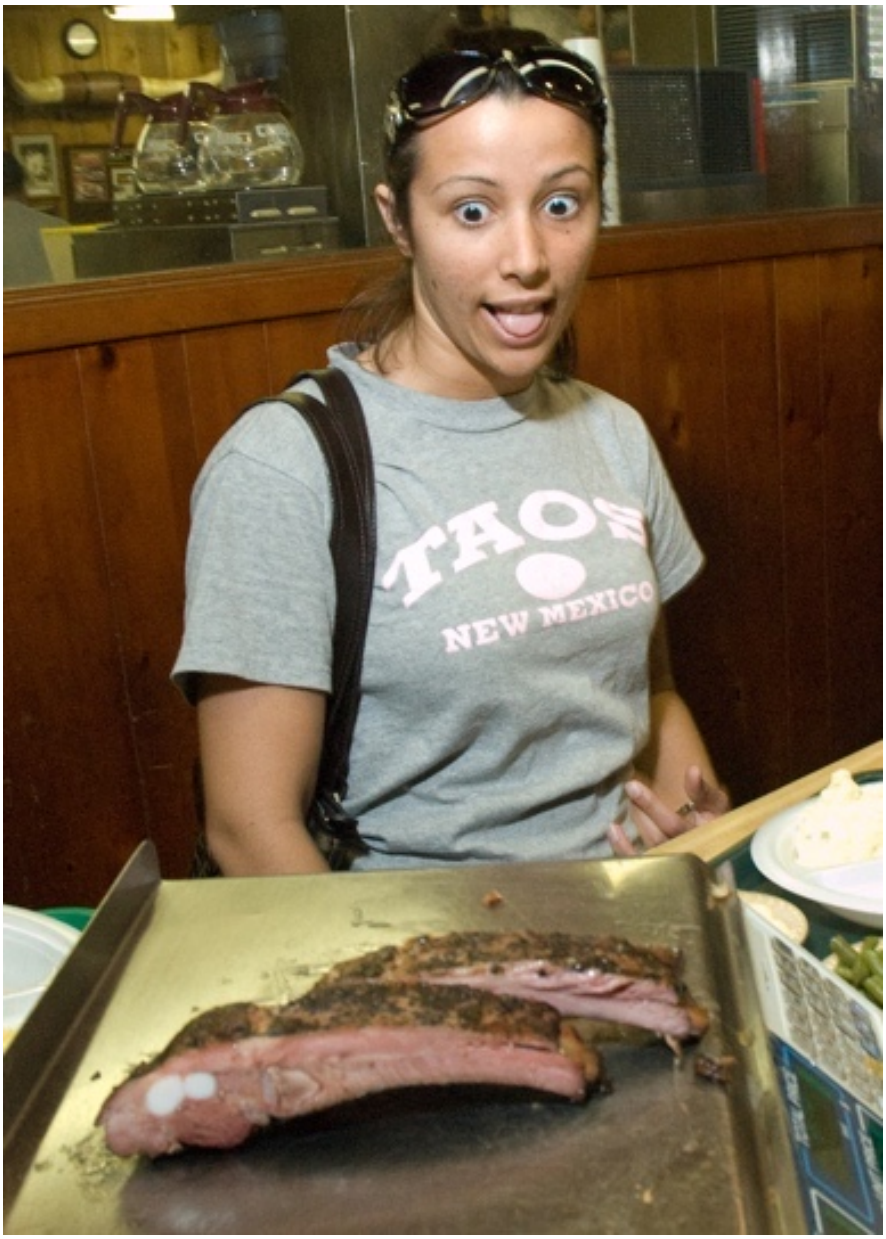
In the old days loin meat sold for more than ribs, but as demand for babybacks has grown, that has changed. So some butchers have taken to slicing a slab of loin meat and labeling it as “boneless babyback ribs.” Ummmm, not.

SPARERIBS (A.K.A. SPARES, SIDE RIBS)



Spareribs are not like spare tires. They aren't extras, leftovers, or somehow inferior cuts of pork with little meat to be found on their bones. Instead, they are the largest ribs and they contain excellent meat that is arguably richer and more flavorful than babybacks, due to more marbling and connective tissue between the bones.

Spareribs are located further down the side of the hog from the babybacks, running all the way down to the breast bone. That's why they are also sometimes called side ribs. If you look at a slab of spareribs, you will notice that on one end you can see the exposed bones and marrow. This is where they were separated from the babybacks. On the other end (the one taken from the chest area of the hog) is basically a large strip of meat filled with small bits of cartilage and gristle called rib tips (defined below). The concave bone side of spareribs usually has a meaty flap that is part of the diaphragm called the flap meat.



According to USDA guidelines, a rack of spareribs must contain at least 11 bones. The bones on spareribs are straighter and flatter than babybacks. You will also notice that the majority of the meat is found *between the bones* versus babybacks, which have a large amount of meat resting *on top of the bones*. Spares are usually a bit less

expensive than babies. A standard 3- to 4-pound slab can serve two people.

ST. LOUIS CUT RIBS (A.K.A. SLC, CENTER CUT, BARBECUE CUT, KANSAS CITY CUT, BABY SPARERIBS)

Take a slab of spareribs, lop off the gristly rib tips, remove the loose bit of meat found on one side, and what remains is a flat rectangular slab called the St. Louis cut. We prefer to call it “center cut ribs.”

While the origins of the name are foggy, legend has it that it is likely due to a butcher in St. Louis who popularized the cut. Some butchers even refer to this cut as “spareribs,” but because the tips have been removed, that is not accurate. If your butcher doesn't know what St. Louis cut means, get a new butcher or simply ask for spareribs with the tips removed. Then again, you may want to remove them yourself and cook the rib tips on the side.

Because the bones are straight and flat, this is the best cut for indoor recipes that require the ribs to be browned in a frying pan, though cooking them low-and-slow on the smoker or grill is our preferred method. When smoke-roasted at about 225°F, they take five to six hours to reach perfection. A standard 2- to 3-pound slab can serve two people or one really hungry big person.

If you decide to compete in KCBS sanctioned BBQ contests, your best rib option is the St. Louis cut.

HALF SLABS: SHORT ENDS AND LONG ENDS

In many rib joints, like the famous Gates Bar.B.Q. in Kansas City, you can order a half slab.

A few joints will ask if you want short end or long end. On a slab of spareribs or babybacks, the bones on one end are longer than on the other. The first six ribs from the shoulder back are the long end ribs. The short end of babybacks is slightly meatier and slightly more tender. The short end may cost $1 more.

RIB TIPS (A.K.A. COSTAL CARTILAGES, BREAKS, TIPS)

Many people think rib tips and riblets are the same thing. In fact, many websites will tell you they are. They are not. Rib tips are strips that have been cut from the lower ends of the spareribs when making St. Louis cut ribs. They typically run about 12 inches long and 1 to 3 inches wide. Here, at left, is a

rigid rib bone from the SLC, and attached to it is the flexible cartilage from a rib tip.

Eating rib tips takes a bit more work than other cuts because they are chewy and the small tubes of cartilage in them go every which way.

In some regions, rib tips are a delicacy and are preferred over other cuts, while in other regions you can barely give them away! Go figure.

When served, they are usually chopped with a cleaver into chunks about 1 1/2 inch square. A strip trimmed from a slab

of spares served with side dishes will fill a normal person. Prepare them the same as you would other rib cuts, but they will cook in 2 to 3 hours. Check this short video of a cook at Lem's in Chicago chopping tips.

Do not try this at home!

RIBLETS

Riblets are made by taking a slab of ribs and cutting them with a saw so the bones are only half as long as normal, perhaps 2 to 4 inches long. This is done to make smaller portions or to remove part of the curve of babybacks and produce a flatter slab.

Riblets are usually served as appetizers, though if you decide to offer them as a main course you can figure 10 to 12 riblets per serving. Applebee’s riblets are, technically, not riblets, (see below).

BUTTON RIBS (A.K.A. APPLEBEE'S RIBLETS, CHINE BONES, BUTTON RIBS)

Photo courtesy of Applebee’s

Despite the name, button ribs are technically not ribs. Applebee's calls this cut “riblets,” but they are not what *had*

been called riblets by butchers in the past. Instead they are a thin, flat strip of meat and bone, not much meat. They are cut from the top of hog's spine where there are little nubs or “buttons.” Because Applebee’s has made them so popular, they can occasionally be found in stores under the name riblets. They are often offered as “all you can eat.“

COUNTRY-STYLE RIBS (A.K.A. COUNTRY RIBS)

Country-style ribs are not really ribs either, they are pork chops. They are meatier and less fatty than real ribs and although you might find a real rib bone or two in a tray of country-style ribs, it's more than likely that you will find a section of shoulder blade. Country-style ribs are cut from the front end of the babybacks near the shoulder. Depending on how they are cut, a serving will be one or two chops. Country-style ribs respond well to brining before cooking.

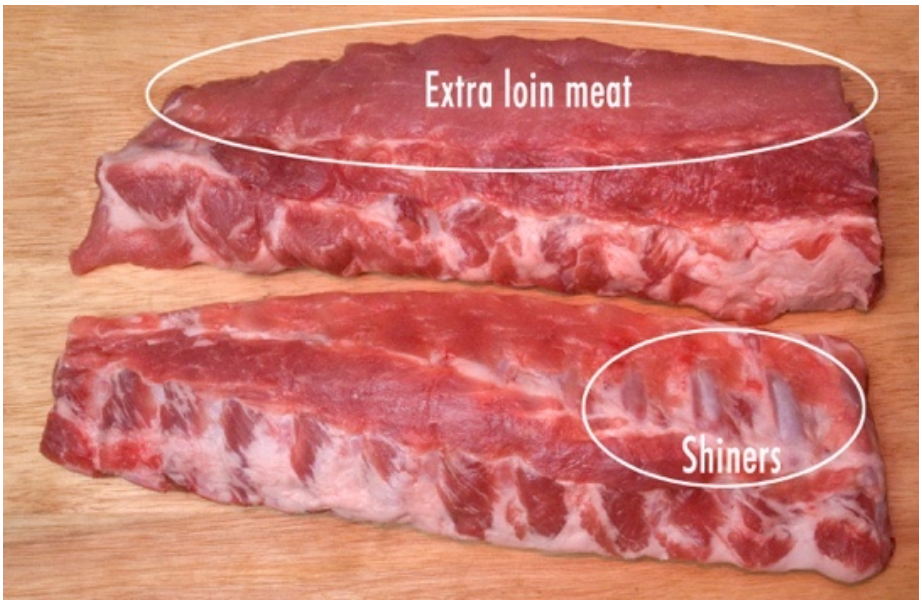
RIB CHOPS

Rib chops are pork chops cut from the long tubular loin muscle (*longissimus dorsi*) that runs along the back of the hog and sits on top of the babyback ribs. If you remove the chine and rib bones you get boneless pork loin and babybacks. They are often sold boneless, and they are, in fact, usually what you get when you buy pork chops.

If you leave the bones and loin attached and trim off the meat from half the bones (horrors!), a process called “Frenching,” and hog tie it in a ring, you get a crown roast.

Carve up a crown roast and you get rib chops like these:

SHINERS

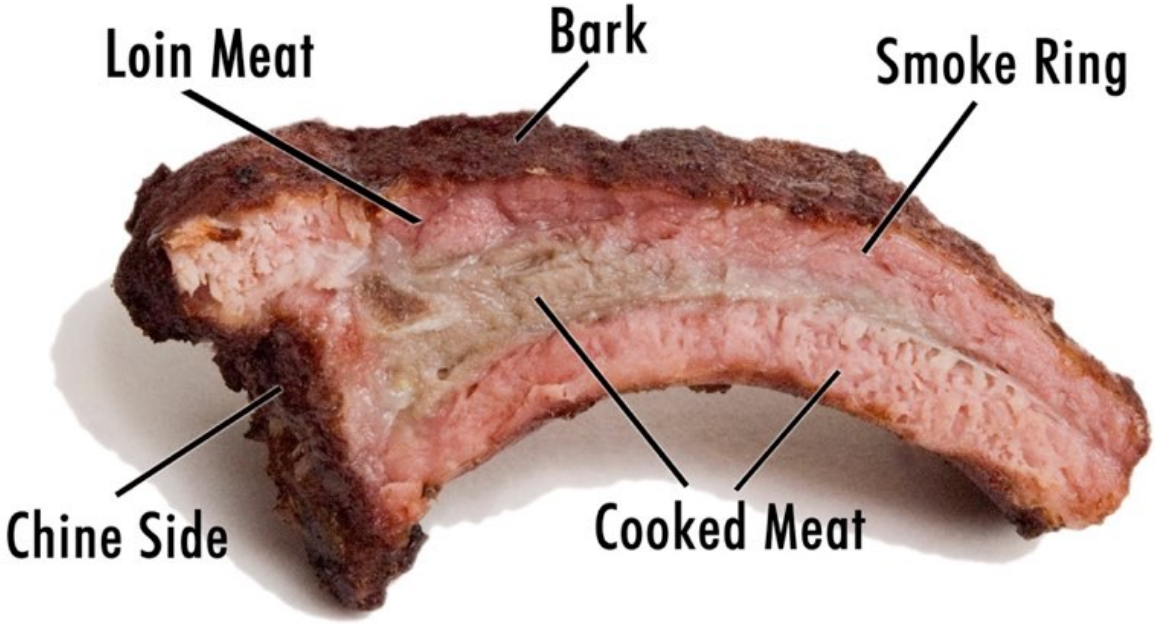


No, shiners are not a set of black eyes. Instead, they are the bones that are exposed on the top of a rack of ribs after the rack has been trimmed too closely. Shiners are more common on babyback (loin) ribs than on spareribs. While shiners don't affect the taste of the ribs, they leave bare spots in the meat once the rack is cooked. This is an issue for competition cooks as shiners mean that you have less nice meaty looking ribs to select from when preparing a turn-in box.

MCRIB SANDWICH

Introduced in the early 1980s, the McDonald's McRib sandwich is an oblong ground pork patty smothered with a ketchupy barbecue sauce, topped with pickle and onion slices, and served on an oblong roll. Likely containing zero actual rib meat due to the cost, the ground meat is formed with corrugations to look as though it has bones. This sandwich has a cult following primarily due to the fact that it is only made available a few times a year. There are even websites devoted to tracking when and where it is available. Instead of waiting for the next drop, however, we have included our own more flavorful twist on this classic here.

KISSED BY SMOKE, HUGGED BY SAUCE, LICKED BY FIRE



Most pitmasters, grillmasters, competition cooks, chefs, caterers, and Southerners agree that there is a “standard of excellence” for Southern-style ribs. Although, at AmazingRibs.com we pride ourselves on being iconoclasts and innovators, and we love the cuisines of other

nations, frankly, when it comes to ribs, we concur. This is what we like best.

APPEARANCE

Amazing ribs usually glisten with a deep ruddy glow from a sweet glaze. Just below there is a dark brown crust, called the bark. Bark is a firm crust that forms as the spices and sugars in the rub meld with the wet meat and then, during cooking, the chemistry changes, undergoing the Maillard reaction and caramelization. Click here to learn more about this important flavorizing metamorphosis. The surface also dehydrates forming something akin to jerky. Click here to learn more about bark.

Below that there is a bright pink layer, about 1/8 inch deep, called the smoke ring, a stamp of authenticity that comes from gases created during combustion combining with a protein in the meat called myoglobin, and also, magic. The rest of the meat is tan, glistening with moisture from meat juices, melted collagen, and fats, and clings gently to the bones. When properly cooked, you will also notice the bones sticking out approximately 1/4 to 3/4 inch on one end, and the exposed marrow has usually turned black.

SCENT

The first thing you will notice when you take hold of an amazing rib is the seductive scent. The goal is for the smoke aromas to compliment and not overpower the smell of the meat and seasonings. Done properly, the smoke should be

sweet and fragrant; done wrong, the smoke is overpowering and smells like an ash tray. Next comes the sweet and spicy scent of the seasonings and the robust aroma of roasted meat.

Something important to remember when cooking: Smoke is composed of tiny particles, water vapor, and gases, all together scores of compounds. Smoke sticks best to cold and wet surfaces, so take your ribs straight from the fridge to the cooker; don’t let them come to room temperature.

TEXTURE

It must be said that taste is a matter of taste, and, while you may enjoy fall-off-the-bone ribs, here's the standard of excellence: Below the sauce, the surface of the meat should have a firm texture. Some people like the bark to be leathery and chewy. Others want it to yield easily. Beneath the bark the meat should be tender yet retain resilience when you bite into it, kind of like a steak. It should pull off the bone cleanly

and with little effort, leaving behind bare bone, but despite what certain restaurant chains would have you believe it should not fall *off* the bone. If it falls off the bone, chances are it has been boiled or steamed. Soon we will explain why we don't recommend steaming or boiling.

FLAVOR

Whatever seasonings or smoke or sauce you use, the individual elements should not be greater than the meat. Great ribs should taste like roast pork. And this is where restaurant ribs often fall short; boiled or held in warming ovens for so long that their natural meatiness is destroyed. All that is left behind is bland grey meat drowning in a pool

of sweet, sticky sauce designed to cover up a myriad of mis-steps in the preparation process.

SEASONINGS

Salt is essential. It amplifies flavor without altering it and enhances the meat's ability to hold moisture. Other seasonings, usually a spice rub, embed into the meat's surface and enhance it, without overwhelming it. In most common rib rubs black pepper, paprika, brown sugar, garlic powder, and onion powder are the other big players.

SAUCE

When used properly, sauce must work in tandem with the meat, seasonings, and smoke flavors. It must remain subtle so as not to overwhelm the other components, and there should not be so much that it is gummy and goopy. It should also only be added in the last few minutes of the cooking process because the sugar content can easily burn when exposed to too much heat.

The typical BBQ sauce, called Kansas City Style, has a deep tomato base that has been enhanced with sweeteners to counterbalance the salty and savory. Beyond the sweetness you will likely also encounter zippy pepper, zing from chile peppers, an acidic bite from vinegar, and perhaps more

herbs and spices that help round out the sauce's flavor profile. But there are other sauces. In South Carolina many are mustard based, and elsewhere in the Carolinas and Georgia, vinegar is dominant with no sweetness. Click here to read about the many regional and traditional styles of American barbecue sauce.

MOISTURE

The meat should be moist and juicy but not wet or mushy. Most of the juiciness is water, but much of it comes from fat. The juices should coat the tongue with flavor. Your salivary glands should not have to work too hard to spread the taste and lubricate the meat for swallowing.

BALANCE

The sum of all the parts must be harmonious, a rich tapestry of textures, aromas, and flavors that work together without dominating and/or masking the others. Execute all of these elements flawlessly and the end result is amazing ribs.

HOW TO MAKE AMAZING RIBS

Please experiment with the different cuts and methods and find the ones that you like best. But, since we have already stated our preference for classic Southern Barbecue Ribs, we'll start with some general concepts towards that end, and then get into specific recipes.

After you master the basics, then it's on to Asian, Tuscan, and other styles. Here's a video shot with our friends, the brilliant geeks at ChefSteps.com that summarizes the process: https://youtu.be/5eASN1gUYNA

IF YOU BOIL RIBS, THE TERRORISTS WIN

At AmazingRibs.com, we like to say "If you boil ribs, the terrorists have won." That phrase, coined by Meathead with the first version of AmazingRibs.com in 2005 or so, is a motto of cooks around the world now.

The idea for boiling and simmering ribs comes from Eastern Europe where Poles and Czechs simmer ribs in water with cabbage, potatoes, carrots, and caraway seeds to create a delicious pork stew. Boiling can make meat tough by causing proteins to contract and squeeze the moisture out of the muscle fibers, but gently simmering, poaching, or braising, can make sinewy cuts like ribs tender. The problem is that much of the flavor ends up in the broth and not in the meat. That is flavor that you cannot get back into the meat. If you are not making stew, by far the best technique is to slowly, gently, roast ribs in warm air, thus maximizing flavor.

Neither should you grill ribs directly over flame or glowing coals. If you are really, really in a hurry, you are better off steaming or microwaving them and then finishing them on the grill or under the broiler.

SKIN & TRIM & RINSE

Each slab of ribs has a meat side and a bone side. The meat side is convex (curving towards you), and the bone side is concave (curving away from you). The bone side has a latex-like membrane called the *pulmonary pleura* covering it. Sometimes it gets leathery and almost unchewable when cooked and sometimes it remains rubbery. A common myth about the membrane is that smoke and rub will not penetrate it when, in fact, it is permeable.

A few butchers and most restaurants "skin" their ribs, jargon for removing the membrane. Some restaurants find removing it to be a bother and leave it on. Those who steam or simmer their ribs find that the membrane helps hold the slab together. A few customers like the chewy texture. We think ribs are better without it and removing it is a courtesy to your guests or customers.

By removing the membrane, you are also exposing a layer of fat that can then melt off as the ribs cook. Some folks just make slits in the membrane to allow some of that fat to

drain, but you still have the texture issue and if you do this in a competition, your tenderness score will tank.

It’s hard to tell in a grocery store when the slab is strapped onto a Styrofoam tray if the membrane has been removed. Ask your butcher, and if the answer is “no,” ask if it can be removed. If the answer is again “no” or if you get the slab home and discover the back is smooth and shiny, it's time to “skin & trim”. It's not hard, once you get the hang of it.

Pictured above is a St. Louis cut rack of ribs. Turn the slab bone side up. There is a flap of thick meat from the diaphragm on SLC that most chefs remove. Some set it aside to chop for stir fry, grind for sausage, or simply toss it in with the ribs. It will be done in two hours and makes a nice snack for the cook. Babybacks do not have flap meat.

If the slab is irregular at the ends or too long to fit on the smoker, trim off a bone or two. Cook them with the slab. They'll be done in two hours for you to snack on along with the flap meat.

Insert a butter knife or an ice pick between the membrane and the meat. We use a butter knife.

Once you have separated a small section of the membrane from the bone, work your fingers under it to loosen it so you can get a good grip on it. Gently begin peeling it off, trying not to rip it.

We use a paper towel to help us grip the slippery membrane. Here's a 20 second video showing the process with a paper towel.

If you work it right, you should be able to pull all of the membrane off in one long strip. Discard it.

Some people like to use catfish skinning pliers, above.

After you pull the membrane, you'll see a thin layer of fat and some chunks. With a sharp knife (we prefer a flexible filleting knife) cut and scrape some of the excess fat off; trim

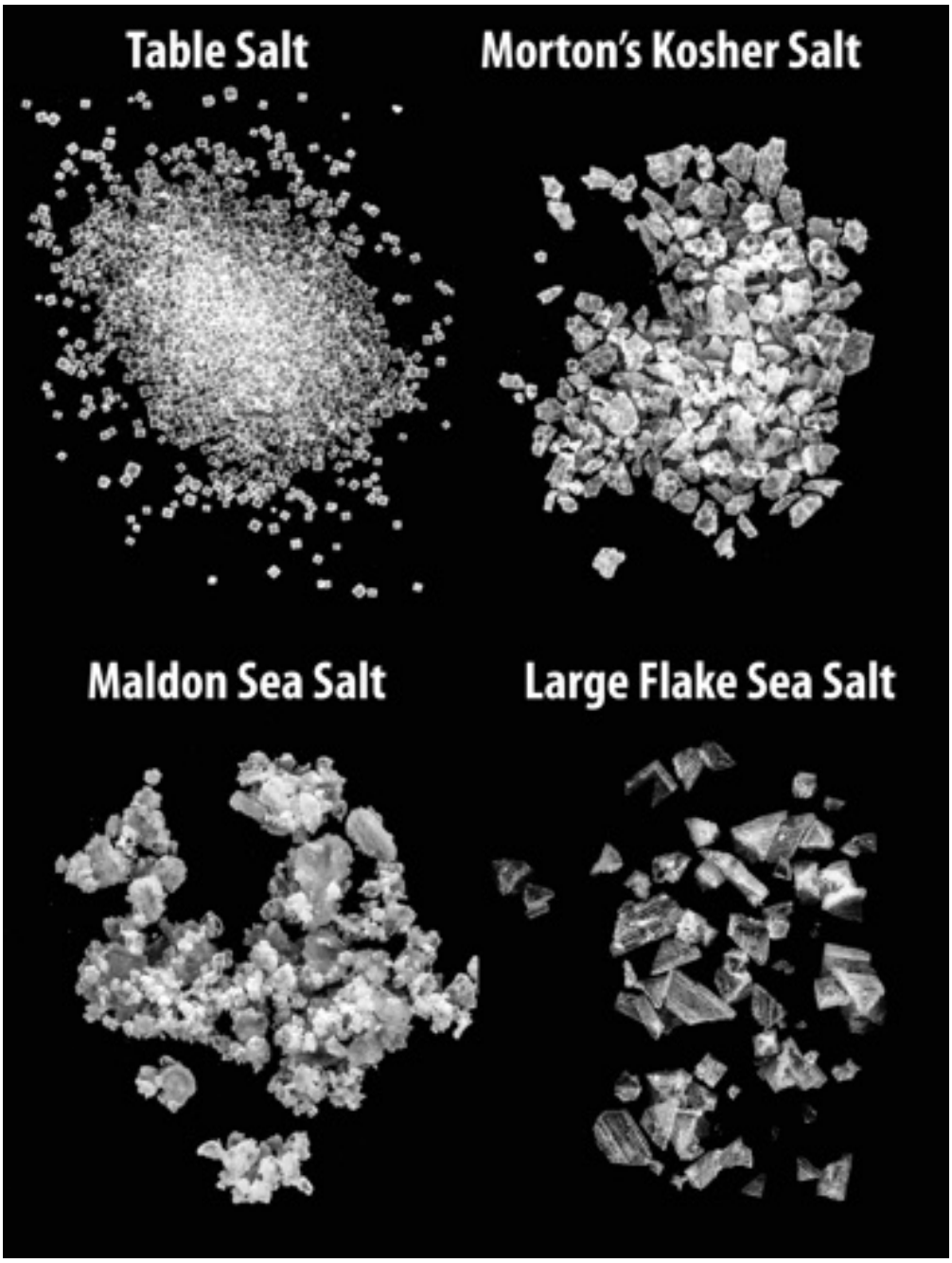
excess fat from the other side too. Some competition cooks trim off a bit of the meat where it is thick, in order to make the slab uniform thickness so all the ribs will cook to exactly the same doneness. For home cooking, we leave it on. We want as much meat as possible!

Now gently rinse the slab. Ribs are often cut with a bandsaw and there can be small bone bits on the slab, so rinse gently being careful not to splash.

There is some risk to rinsing meat in the sink because juices can splash and even aerosolize with tiny droplets containing bacteria that could land on things in the dish drain or the counter. So be gentle. Keep the water pressure down.

DRY BRINE IT

Salt (NaCl) is the magic rock. Its two little atoms, sodium (Na) and chlorine (Cl), become electrically charged when they get wet from the moisture on the surface of the meat, and they can penetrate slowly to the center of the meat. Once in there they also alter the proteins and help them retain water. Salt also amplifies flavor without altering it. So, if you have time, salt your ribs an hour or three before cooking. Our rule of thumb for most meats is 1/2 teaspoon Morton Coarse Kosher Salt per pound of meat. Table salt has smaller grains and less air between the grains so use 1/4 teaspoon per pound. But ribs are only about half meat, so cut the ratio in half, i.e., use 1/4 teaspoon Morton Coarse Kosher Salt or 1/8 teaspoon table salt per pound of ribs. This process of salting hours before cooking is called dry brining. Read more about the science of salt here, and dry brining here.



You can add the rest of the seasonings, such as the rub, at the same time as the salt if you wish, but they will not go more than a fraction of an inch beyond the surface because their molecules are too large. Spices and herbs tend to draw moisture out of the meat so we recommend saving them for

just before cooking. This is one of the reasons why we strongly recommend you make your own rubs.

SEASON IT

The rub should fuse onto the meat's surface and enhance the meat, but not overwhelm it. Meathead's Memphis Dust was formulated just for pork and is used by many competition teams, caterers, and restaurants. In fact, some commercial rubs are copies of Meathead's Memphis Dust. The recipe is here.

Beware: Some commercial rubs can be half salt. That's some expensive salt! But salt and spices should be applied differently. Because salt penetrates the meat, you need to apply it based on the weight of the meat. Because spices sit on the surface you apply them based on the surface area. For example: A slab of ribs and a hunk of pork shoulder might have the same amount of surface area but the shoulder can weigh 2 to 3 times the ribs and be many times thicker. So you need more salt on the shoulder but the same amount of spices. For this reason (and others) you should consider making your own rubs sans salt. We have rub recipes on AmazingRibs.com for pork, poultry, beef, lamb, seafood, and more. But if you don't want to bother, we have bottled rubs with salt for sale in stores and on our site.

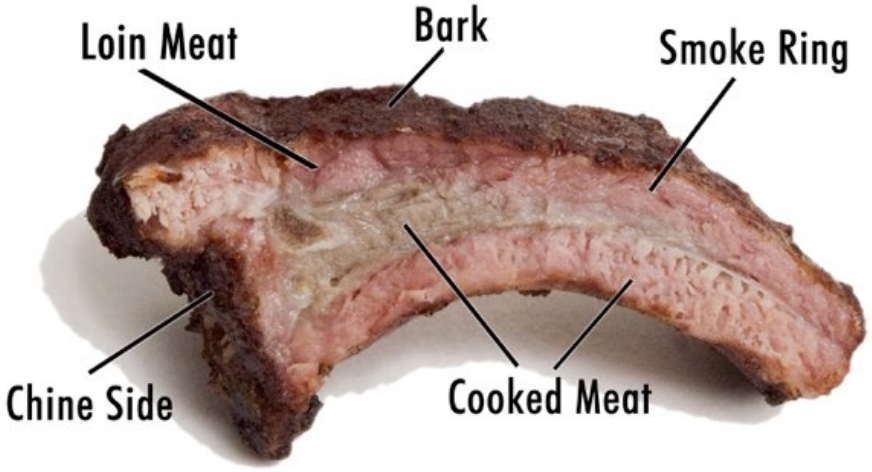
Before sprinkling on the rub, many cooks like to coat the ribs with a layer of mustard, ketchup, mayo, or water as a glue to hold onto the rub. These “slathers” have almost zero impact on flavor because they drip off and dry up during the cook. But they do work as a glue. Clint is partial to mayo because it is mostly oil and fat is flavor. Meathead just wets his hands and pats the meat to moisten it.

Don’t be stingy with the rub. With a spice shaker with large holes, sprinkle on enough to coat the surface but not so much that you can’t see the meat below. About 1 teaspoon for every 4 x 4-inch square is a good rule of thumb to start.

COOK IT LOW AND SLOW WITH SMOKE

We are huge fans of smoking ribs. You can make mighty good ribs indoors, and we have some recipes for you below if that's your preference, but we think ribs are best smoke-roasted outdoors.

The ideal cooking temp is about 225°F, hot enough to brown and dry the surface and develop a good bark, melt fat and collagens, but not so hot as to shrink the meat too much and make it tough and dry. On most cookers, when the oven temp is 225°F at sea level, it takes *about* three to four hours to cook a slab of babybacks and *about* five to six hours to cook a slab of St. Louis cut ribs or spares.



Combustion gases in smoke, specifically nitric oxide (NO) penetrate the surface of meat and lock down the pink color of a protein called myoglobin, thus creating the smoke ring. Inexperienced diners sometimes think the meat is undercooked and send it back in restaurants, but if that were the case, the center would be pink, not the outer layers, because heat cooks the outer layers more than the center.

About halfway through the cook you might need to swap slabs that are furthest from the heat with those that are closest. You should not need to flip the slabs.

SPRITZ AND MOP

Spritzing and mopping ribs periodically with beer, apple juice, water, or another liquid is a common practice. They replace a bit of lost moisture, cool the meat, slow the cook time, and help the smoke stick. This can be good or bad. Longer times usually mean more tender meat. You are also losing a little heat every time you open your smoker or grill which also adds to the overall cooking time,

but not by much. And while it is true that wet surfaces hold smoke better than dry, spritzing too much can wash off rub and smoke particles. Spritzing can also soften bark. Finally, if you are expecting the liquid to somehow add depth to the final product, the flavor molecules in apple juice and other liquids are so few and far between (measured in parts per million) that they have no impact on taste. Click here to read more about basting.

THE TEXAS CRUTCH AND 3-2-1

The Texas crutch is a clever technique that all competition cooks use because it speeds cooking, retains a bit of moisture, and improves tenderness.

The crutch involves wrapping the slab of ribs in foil or pink butcher paper shortly after the meat has a nice dark color

and when it has started to pull away from the bone.

Competition cooks often add brown sugar, more rub, honey, agave syrup, apple juice, butter, or margarine, to the packet in an effort to boost flavor. Clint employs this technique in Clint's Competition Ribs.

If you wrap tight, moisture loss from evaporation stops and this speeds cooking because evaporation cools the meat. Some liquid comes out of the meat to mingle with the added liquids and the meat slightly braises and tenderizes.

There is a tradeoff in wrapping. It hampers bark formation. Years ago someone came up with a technique called 3-2-1. It prescribes smoke-roasting the meat for 3 hours, then wrapping it and putting it back in the cooker for 2 hours, then taking it out of the wrap and smoking it for 1 hour more. We are not fans.

Wrapping ribs for 2 hours is a recipe for overcooked mushy meat. At most you should wrap the rack of ribs for one hour. Try this: 3-1-1 for babybacks and 4-1-1 for spares and St. Louis cut. Then experiment to find your favorite formula.

We usually don't bother with the crutch at home because the improvement isn't so great that it is worth the effort and expense of the foil. But in competition, with thousands in prize money, you need every edge you can get, so crutching is essential. If you've seen it on TV and must try it, click here to learn more about the science behind the Texas crutch and how to do it properly.

Like everything in barbecue, there is controversy over the crutch. Some swear by foil, others prefer the butcher paper. We find the differences minor and inconsistent.

ARE THEY READY YET?

There is an old joke among some KCBS competition cooks about how to tell if the St. Louis cut ribs are ready (that's the cut they favor). Take a slab of SLC and a slab of babybacks and put them both in the smoker. When the babybacks are dry, the SLC ribs are done.

OK. Maybe that's a bit extreme. But it underlines how hard it is to tell when ribs are ready. That's because ribs come in so many different weights and thicknesses. Not to mention the fact that keeping an outdoor oven at a precise temp is tricky. So here are some guidelines and techniques for telling when ribs are done.

We like to differentiate between “done” and “ready.” It’s a fine semantic line, but an important one when it comes to barbecue.

Meat is “done” when the temperature at its thickest reaches the point at which it is safe to eat. But that doesn't mean it's “ready.” According to USDA, pork is “done” when it is 145°F internal temp (that’s “medium”), and that is fine for a pork chop (actually we prefer chops at 135 to 140°F), but ribs will still be tough at those temps. If you take them up to between 200 to 203°F, the collagens and fats melt and make the meat more tender and juicy. That’s well past well-done (155°F). But they're ready!

We are huge advocates of thermometers. Nothing will make you a better cook than using good digital thermometers, and these are not expensive. You need to know the air temperature next to the meat inside the oven (not in the hood unless you plan to eat the hood), and the temperature of the meat in the center of its thickest point. At AmazingRibs.com we employ an electrical engineer to test thermometers, and we outfitted him with expensive bench testing equipment. His searchable database of almost 200 thermometers is the place to start your shopping (remember, we don’t sell anything). Below, in the tools

section, we recommend one that can measure both oven and meat for about $40!

That being said, it is really hard to read the temperature of ribs. The meat is too thin and varies in thickness from end to end and side to side. In addition, the meat next to the bone can be a different temperature than in the middle of the bones. There are a number of tricks the pros use to tell when ribs are ready. Remember, at 225°F babybacks are getting there after 3 to 4 hours and spares and St. Louis cut are usually ready after 5 to 6 hours. Here's how to tell if they really are ready.

Start by checking the temperature between the bones in several places. As they approach ready, twist a bone near the center of the slab: if it turns easily, that's a good sign. Some experts stick the meat with a toothpick and if it slides through easily, that's a good sign. We lean on the bend test. Pick up the slab with a pair of tongs and bounce them slightly. If they are ready, the slab will bow until the meat starts to crack on the surface. A small crack means you need a little more time. It should be close to breaking in half when you lift the slab. You'll get the feel for this with practice.

Click here for a Food Temperature Guide for other meats.

SAUCE AT THE END

We know you love sauce, but sauce, if you use it at all, should remain subtle so as to not overwhelm the other components, pork, rub, and smoke. When adding sauce to ribs, be sure to do so only in the last few minutes of cooking, after the bend test, allowing just enough time for the sauce to become tacky but not long enough for the sugars in it to burn. One or two coats is enough. We often lift the lid on the smoker and paint on the sauce, fire up the gas grill or the indoor broiler, and hit the slab with direct heat, grill lid open, and stand there for a minute or two, waiting for the sauce to sizzle and the sugars to caramelize, flip and repeat, and then we're ready to serve.

For serving, sometimes we just cut a slab in half and give each guest a half slab. When we have a crowd of people and a lot of other food, or for competitions, we slice the slab into individual bones. This is hard to do with the meat side up because it is hard to find the middle between the bones, so there are two strategies. One technique is to flip the slab upside down. Unfortunately this will often remove sauce and mess up the beautiful sheen. Another technique is to stand the ribs on one long end and slice downward between the bones. It's a little tricky to get a good cut this way and you have to be careful the slab doesn't slip and you slice off a finger.

Sometimes, in competition, pitmasters will run the knife along the bone making every other bone extra meaty on both sides; this is called the "Cadillac cut." The middle bone is pretty nekkid and the team gnaws on them while awaiting their scores.

PART VII
RECIPES

Now that you have the basics down, here are some of our favorite recipes. But first a few tips.

Tinkering. We know you like to tinker. *Do us and yourself a favor, try our recipes our way with no changes the first time.* You will then have a memory of what the recipe is *supposed* to taste like.

If the recipe calls for regular old fashioned granulated white sugar, don't use brown sugar. If it calls for boring old distilled white vinegar, don't reach for the cider vinegar. We worked very hard to perfect and test these recipes and some substitutions just don't work. After you've tasted the dish the way we intended it to taste, then the next time you make it, riff on it however you want.

Here are some key steps to creating a successful dish.

Timing. Prep times include all the washing, measuring, chopping, and peeling. Cooking times are our best

guesstimates based on our tests, but keep in mind, this is food, not a widget, and two seemingly identical chickens may cook at different rates. No two cookers are exactly alike. Weather, humidity, and wind also impact outdoor cooking times. Click here to read more about what influences cooking time.

Wood. We have not specified precisely how much wood you will need or what type of wood to use for smoking because the strength and flavor of wood depends on many variables, including the nature of your cooker and your preferences. Go easy at first. A meal is never ruined by too little smoke. Measure wood and keep records with a cooking diary (you can download one here).

2-zone almost everything. For most recipes on a grill, we recommend 2-zone cooking. *The indirect convection heat zone is for slow roasting and smoking.* It is cooler and acts as your safe zone for when pieces finish early or if they are cooking too fast. Whenever cooking over indirect heat, we always specify an air temperature, usually 225°F or 325°F. You need a good digital oven thermometer with a probe placed on the cooking surface near the food. A thermometer in the dome cannot be trusted.

Over the direct infrared radiant energy zone, we want lots of fire power for searing. "Give 'er all she's got, Scottie." For searing, we usually do not specify the temperature because most cooking thermometers cannot go high enough and infrared radiant energy is best measured in calories rather than temperature. Moreover, the direct radiant heat side is usually only being used for searing and browning the

surface. The food isn't there for long. We sometimes call cooking by direct infrared radiant heat Warp 10, Warp 9, Warp 8, etc. in homage to Star Trek.

Lid position. Almost all the recipes in this book require you to cook, roast, bake, and smoke with indirect convection heat with the lid down. In most cases when we ask you to sear, the food is over direct infrared radiant heat, and the lid is up.

Some recipes call for cooking in a pan or pot. You can do that on the direct heat side or on your side burner, or, horrors, indoors. We strongly recommend that you have a frying pan and a sauce pan set aside just for outdoor cooking. You can cook with your best expensive pots and pans, but sometimes they fall, or get scorched, and we don't want to risk the wrath of a spouse by ruining a wedding gift.

Salt. We use Morton Coarse Kosher Salt. No Morton did not pay us. Different salts have different grain size and that can influence salinity when measured by volume (teaspoons, tablespoons, cups) rather than weight. We wanted to standardize on one salt, and the grain size of Morton Coarse Kosher Salt makes it easy to pinch and scatter. If you substitute table salt, cut the quantity in half since it is more concentrated. Click here to learn more about the science of salt and see a conversion calculator for different salt types.

Black pepper is always best when ground fresh. Ditto for other spices that start out as seeds.

Butter is usually unsalted in our recipes. We prefer to control the salt content precisely without the wild card of an unknown quantity coming from the butter. That said, if you

use salted butter, there is so little that the recipe will probably turn out fine, especially if you cut back a tad on other salt.

Eggs are large.

Flour is all-purpose flour.

Fruits and vegetables are medium size, and they should always be fresh and scrubbed with cool water.

Garlic powder is pure garlic powder, never garlic salt, which has salt in it. You should control salt separately.

Mayonnaise. Never substitute Miracle Whip or light mayonnaise for mayonnaise. The chemistry is very different. Among other things, Miracle Whip has two kinds of sugars, mayo has none.

Milk is whole milk. You can get away with 2% in many cases, but not skim milk, soy milk, almond milk or any other substitutes. If we call for half-and-half or cream, it is because we think the fat is important to the chemistry. You can probably substitute one for the other, but don't use milk.

Oil is usually olive oil unless otherwise noted and is usually extra-virgin olive oil if it is not being heated. If it is being heated, use inexpensive olive oil or vegetable oil.

Sugar is granulated white sugar. Sugar is a common ingredient in spice blends and sauces because it is a flavor enhancer, it helps browning, and it encourages crust formation. When we want brown sugar, we will call for it.

Ingredients are listed in the order in which the recipe calls for them. If you see the term “divided” it means that the ingredient will not be used all at once.

Mise en place. Always practice *mise en place* (i.e. putting everything in its place). Gather all your ingredients and chop, slice, and dice before you apply heat to anything. You don’t want to be scrambling to chop an onion while things are cooking in the pan. This is a vital foundation level concept.

MEATHEAD'S MEMPHIS DUST

If you've ever enjoyed true Memphis barbecue at world famous joints like Paynes, Cozy Corner, Rendezvous, Corky's, or the Bar-B-Q Shop then you know that the "go-to" dish is Memphis dry rub ribs. Unlike BBQ

ribs in other parts of the country that are slathered in sauce, Memphis-style ribs are dressed with nothing more than a flavorful spice blend that lets the perfectly smoked meat shine through. In Memphis they season the meat with the rub before smoking then apply a second light coating just before serving. Or as the rack of ribs once said to a famous Memphian, perhaps inspiring a song: Rub Me Tender, Rub Me True.

The fun part about making rubs is the fact that you can add or subtract ingredients in order to suit your own taste. For example, this recipe has no chile heat in it because some people just can't take it. But we almost always add some.

Then, when properly impressed guests ask "What's your secret?" you can answer, as the pros do, "It's my rub, man."

After you use it on Last Meal Ribs try it on Perfect Pulled Pork, smoked salmon, raw celery stuffed with cream cheese, on the rim of a Bloody Mary, and even popcorn.

Makes. About 3 cups. At about 2 tablespoons per slab of ribs, this is enough for 24 slabs. Store the extra in a zipper bag or a jar with a tight lid at room temperature.

Takes. 15 minutes. 10 minutes to find everything and 5 minutes to dump them together.

- 3/4 cup firmly packed dark brown sugar
- 3/4 cup white sugar
- 1/2 cup paprika
- 1/4 cup garlic powder
- 2 tablespoons ground black pepper

- 2 tablespoons ground ginger powder
- 2 tablespoons onion powder
- 2 teaspoons rosemary powder

About the sugar. *We appreciate that many of you feel the need to reduce sugar in your diets but sugar is in this recipe for more than flavor enhancement, it helps form the bark, an important part of the texture of the surface of ribs and smoke roasted pork. It mixes with the moisture and caramelizes, creating special unique flavors.*

There are only about 2 tablespoons of rub on a large slab. Of that about 1 tablespoon is sugar. Some of it falls and drips off during cooking. If you eat half a slab, you're eating about 1 teaspoon of sugar. The glycemic load (GL) is about 3. Compare that with a slice of white bread with a GL of 10.

And for those of you who object to white sugar for non-dietary reasons, and use brown sugar instead, you need to know brown sugar is just white sugar with molasses added. It is not unrefined sugar as many people believe. We use brown sugar for the flavor and white sugar because it improves the bark.

If you want to cut back on carbs, leave off the sweet barbecue sauce. It has a ***lot*** *more sugar than the rub. Switch to a Lexington sauce which is mostly vinegar, or just eat the pork Memphis style, with rub and no sauce. It's mighty good that way.*

About the rosemary. *Several readers tell us they hate rosemary and leave it out. Trust us, it hides in the background and you will never know it is there. It is subtle and important in this blend. Substitute thyme or oregano if you must, but we think rosemary is*

the best choice. If you can't find ground rosemary just grind the leaves in a mortar and pestle or in a coffee grinder or a blender. It will take 2 to 3 tablespoons of leaves to make 2 teaspoons of powder.

About the paprika. *If you read our discussion of paprika by clicking this link you'll learn about the different kinds of paprika. In short, garden variety grocery store American paprika has little flavor and is used mostly for color. However fresh Hungarian or Spanish paprika have mild but distinctive flavors. In many European countries, paprika is hot. Not in the US. If you wish, you can use smoked paprika, especially good if you are cooking indoors, or even mix in some stronger stuff like ancho (slightly spicy), chipotle powder, cayenne, or chili powder (not very hot). Chipotle can be quite hot, so be thoughtful of who will be eating your food.*

***Optional**. If you'd rather not make this rub from scratch you can click this link and buy Meathead's Amazing Smoked Pork Seasoning & Dry Brine instead. It is very similar. Keep in mind that our bottled rubs have salt in them. When using the bottled rub, you do not need to add the salt that is called for in the recipe.*

Method

Mix the ingredients thoroughly in a bowl. If the sugar is lumpy, crumble the lumps by hand or on the side of the bowl with a fork. If you store the rub in a tight jar, you can keep it for months. If it clumps just chop it up, or if you wish,

spread it on a baking sheet and put it in a 175°F oven for 15 minutes to drive off moisture. No hotter or the sugar can burn.

KANSAS CITY CLASSIC SAUCE

Although there are several distinctly different regional styles of BBQ sauce in the US, the thick red stuff is what most of us reach for when our spouse says “pick up some barbecue sauce, willya?”

If you are no longer living with your parents, you really should have a homemade sauce so that when your guests ask "What brand of sauce is that?" you can plunk a hand-labeled bottle on the table. When they beg you for the recipe, you can then tell them "It's a secret," and mumble the old saw that ends in "...and then I'd have to kill you."

Most Kansas City sauces are brass bands with multiple layers of flavors, sweets, and heats. They go shamelessly for the sweet tooth. The best have multiple sources of sweetness (brown sugar, molasses, honey, and onion—which gets sweet when it is cooked); multiple sources of tartness (vinegar, lemon juice, hot sauce, and steak sauce); multiple sources of heat (American chili powder, black pepper, mustard, ginger, and hot sauce); it gets layers of flavor from all the above as well as ketchup, Worcestershire, garlic, and salt. Because these sauces are thick and tomato-y, they sit on top of the meat, not penetrating very far. For this reason you don't want to use too much. Just one or two layers, max. Let the meat shine through. Don't drown it in sauce.

That's the idea behind this recipe. It's not the popular storebought brand "KC Masterpiece," but it is a KC Classic. Try this recipe and you'll never use the bottled stuff again. Or click here for your choice of the classic American regional barbecue sauce recipes.

Makes. 6 cups.

Takes. 45 minutes even if you take a phone call

- 2 tablespoons American chili powder

- 1 teaspoon ground black pepper
- 2 teaspoons Morton Coarse Kosher Salt
- 2 cups ketchup
- 1/2 cup yellow ballpark-style mustard
- 1/2 cup cider vinegar
- 1/3 cup Worcestershire sauce
- 1/4 cup lemon juice
- 1/4 cup steak sauce
- 1/4 cup dark molasses
- 1/4 to 3/4 cup honey
- 1 teaspoon hot sauce
- 1 cup dark brown sugar
- 3 tablespoons vegetable oil
- 1 medium onion
- 4 medium cloves of garlic

***Optional**. Add 1 teaspoon of liquid smoke.*

***About the vinegar**. Trust us, although it may taste tart from the bottle, it is perfect on meat.*

***About the steak sauce**. There are many different brands and they all have different flavor profiles, but what we want here is the meaty depth of savoriness that they call umami, so use whatever you have on hand.*

***About the hot sauce.** A simple sauce like Tabasco is all you need. We like the chipotle version of Tabasco.*

***About the oil.** You may use butter or bacon fat for a bit more flavor, but keep in mind, they can get rancid with time, and they*

will likely shorten shelf life to about 1 week. Use a bottled vegetable oil and it can keep months.

About the dark brown sugar. *You can use light brown sugar if that's all you have.*

Secret optional ingredient. *Add 2 tablespoons of tamarind paste. It has a sweet citrusy flavor and really amps up a sauce. If you can't find it in an Indian or Asian grocery, it is available online.*

Another option. *If you'd rather not make this sauce from scratch you can click this link and buy Meathead's Good Enough To Drink KC BBQ Sauce instead. It is very similar.*

Method

1| Mix. In a small bowl, mix the American chili powder, black pepper, and salt. In a large bowl, mix the ketchup, mustard, vinegar, Worcestershire, lemon juice, steak sauce, molasses, honey, hot sauce, and brown sugar. You don't have to mix thoroughly.

2| Simmer. Chop the onions into small chunks. Over medium heat, warm the oil in a large saucepan. Add the onions and sauté until limp and translucent, about 5 minutes. Press or

mince the garlic, add it, and cook for another minute. Add the dry spices and stir for about 2 minutes to extract their oil-soluble flavors. Add the wet ingredients. Simmer over medium heat for 15 minutes with the lid off to thicken it a bit.

3| Taste and adjust. Add more of anything that you want, a little bit at a time. It may taste a bit vinegary at first, but that will be less obvious when you use it on meat. Strain it if you don't want the chunks of onion and garlic. We like leaving them in, they give the sauce a home-made texture. You can use it immediately, but we think it's better when aged overnight. You can store it into clean bottles in the refrigerator for a month or two.

LAST MEAL RIBS

This is the recipe that started it all: A recipe for making what will probably be the best ribs you ever

tasted. Cooked low and slow on a smoker or grill, these ribs are juicy, tender, rich, succulent, and full of flavor. The scent clings to your fingers for hours and they are so good you would ask for them as your “last meal.” Here’s a video of the process https://youtu.be/9GTvBjWioYY

Makes. 2 servings of 1/2 slab each

Takes. 15 minutes to skin & trim and rub. Cooking time can be 3 to 6 hours depending on the cut you choose, how thick it is, and how well you regulate temperature. We will be cooking low and slow at about 225°F, so allow 5 to 7 hours for St. Louis Cut (SLC) ribs or spareribs, and 3 to 4 hours for babyback ribs. Thicker, meatier slabs take longer.

- 1 slab babyback ribs or St. Louis cut ribs or spareribs
- 4 tablespoons Meathead's Memphis Dust
- 1 teaspoon Morton Coarse Kosher Salt
- 1 cup Kansas City Classic Sauce *

** **About the Kansas City BBQ Sauce.** If you'd rather not make this sauce from scratch you can click this link and buy Meathead's Good Enough To Drink KC BBQ Sauce instead. It is very similar.*

Method

1| Skin & trim. If the butcher has not removed the membrane from the bone side of the ribs, remove it yourself. Rinse carefully.

2| Salt. Dry brine the ribs. Use about 1/4 teaspoon per pound. If you can, give the salt 1 to 2 hours to be absorbed.

3| Rub. Wet your hands and pat the meat so it has a slight wet film on it for the rub to stick to. Sprinkle enough Meathead's Memphis Dust to coat all surfaces but not so much that the meat doesn't show through. Pat the Dust in.

4| Fire up your smoker or set up your grill for 2-zone cooking and get it to 225°F in the indirect zone.

5| Smoke. Add about 4 ounces of dry wood at this time. Put the wood as close to the flame as possible.

6| Relax. Put the slabs in the cooker in indirect heat, meaty side up, close the lid, go drink a beer, read a book, or make love.

7| More smoke. When the smoke dwindles after about 30 minutes, add another 4 ounces of wood. That's it. Stop adding wood. If you have more than one slab on, halfway through the cook you will need to move the ribs that are

closest to the fire away from the heat, and the slabs farthest from the flame in closer. Leave the meat side up; there is no need to flip the slabs.

8| The bend test. The exact time they will be ready will depend on how thick the slabs are and how steady you have kept the temperature. Then check to see if they are ready using the bend test.

9| Sauce and serve. When the meat is ready, paint both sides with sauce and cook for another 15 minutes or so or sizzle it on a hot grill for just a minute or two. One coat of a thick sauce should be enough. Now be ready to take a bow when the applause swells from the audience.

CLINT'S COMPETITION RIBS

This is what a turn-in box might look like

So you think you make the best ribs in your neighborhood? Thinking of entering a competition to prove it?

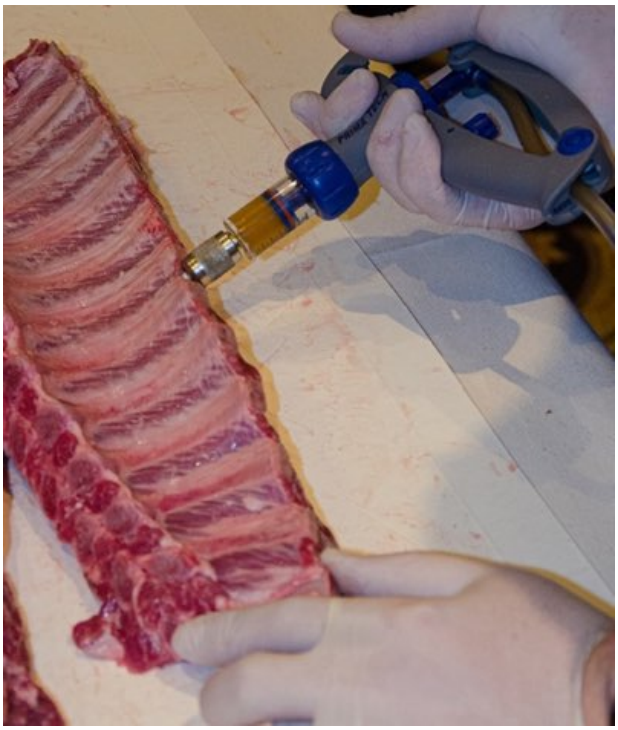
The sad truth is that the ribs your family and neighbors love at home probably won't work in competition. When Clint started competing with team Smoke In Da Eye in 2003, he was certain that his backyard rib recipe was good enough to hold its own. It did not. In fact, he came within spitting distance of DAL (Dead Ass Last), as he did in the other three categories entered.

He walked away vowing never again to compete. But the competition bug hit hard, and he was back at it a month later. During that brief break, he turned to online BBQ forums and fellow competitors for advice. Slowly but surely, his ribs began to move up the rankings, and a few contests later he landed in the top ten. These ribs took second:

To honor those who helped him up his game, here are his best tips and his personal competition ribs recipe. Think of the recipe as a template, and feel free to customize it with different rubs, sauces, and seasonings. If you want to produce award-winning ribs, you need to know these tricks.

This is what the judges get

One warning: Competition ribs are built to impress judges who might only take one bite. Most competition cooks do not cook such exaggerated flavors at home. Read more on that subject here. For example, some competitors even inject special flavor enhancers and moisture retaining compounds *between the ribs!* Clint doesn't.



This cook injects between the bones!

If you want to learn more about techniques and recipes for the other meats in competitions, click here.

Makes. 2 servings of 1/2 slab each.

Takes. 10 minutes to prep. 5 hours to smoke.

Special Tools. Heavy duty foil. Four to five chunks of your favorite smoking wood.

- 1 slab St. Louis cut spareribs
- 1/4 teaspoon Morton Coarse Kosher Salt per pound of meat
- 4 tablespoons Meathead's Memphis Dust *
- 3 tablespoons mayonnaise
- 1/4 cup (1/2 stick) margarine such as I Can't Believe It's Not Butter

- 2 tablespoons honey
- 1/4 cup brown sugar
- 2 tablespoons apple juice
- 1/4 cup KC style BBQ sauce **

About the mayonnaise. *The mayonnaise acts as a binding agent for the dry rub without altering the flavor of the finished meat. Unlike mustard, mayonnaise is high in fat, something that can only benefit the ribs.*

About the margarine. *We know. You want to use real butter. But after years of experimenting, competitors all agree that margarine works better in this application.*

*** About the Meathead's Memphis Dust.*** *If you'd rather not make this rub from scratch you can click this link and buy Meathead's Amazing Smoked Pork Seasoning & Dry Brine instead. It is very similar. Keep in mind that our bottled rubs have salt in them. When using the bottled rub with this recipe, you do not need to add the salt that is called for in the recipe.*

** ***About the sauce.*** *You can use our Kansas City Classic Sauce, but if you'd rather not make this sauce from scratch you can click this link and buy Meathead's Good Enough To Drink KC BBQ Sauce instead. It is very similar.*

Method

1| Skin & trim. If the butcher has not removed the membrane from the bone side of the ribs, remove it yourself. Rinse carefully.

2| Salt. Dry brine the ribs. If you can, give the salt 1 to 2 hours to be absorbed.

3| Fire up. Prepare a grill or smoker for 2-zone indirect cooking. Get it to about 225°F and add 2 to 3 chunks of your favorite smoking wood.

4| Season. Once the smoker or grill is ready, brush both sides of ribs with mayonnaise and season with Meathead's Memphis Dust.

5| Cook. Place the slab meat side up as far away from the heat source as possible. Close the lid. Allow the ribs to smoke until the meat just begins to shrink back from the ends of the bones, *about* 3 1/2 hours.

6| Texas Crutch. Lay out two layers of 18-inch heavy-duty aluminum foil approximately 10 inches longer than the ribs. Spread two tablespoons margarine, one tablespoon honey, and two tablespoons brown sugar on the foil underneath where the ribs will sit. Lay a slab meat side down on the margarine mixture. Place another two tablespoons margarine, a tablespoon of honey, and two tablespoons brown sugar evenly on top of the bone side of each slab of ribs. Fold in the long sides of the foil. Then fold up the sides of the foil to create a boat, pour in the apple juice, and tightly crimp the sides together.

7| Cook some more. Place the foiled ribs crimped side up on the cooker and cook no more than 1 hour.

8| Remove the ribs from the smoker or grill and cautiously open the foil packet to allow the steam to escape. Remove the

ribs from the foil and set them back on the cooker meat side up. Close the lid and allow the ribs to cook about 20 minutes to firm up the bark. See if they are ready with the "bend test." You can discard the liquid in the foil or, if you wish, use it as part of a sauce.

9| Sauce. When they are ready, brush sauce on both sides of the ribs and turn them meat side up on the smoker or grill. Close the lid and cook until the sauce sets and becomes tacky, 3 to 4 minutes.

10| Serve. Remove the ribs from the smoker or grill, and slice. For competition, arrange them artfully on a background of whatever greens the competition allows.

CHINATOWN CHAR SIU RIBS RECIPE

Everybody loves Chinese restaurant ribs. They have a distinct pork flavor, a glossy sheen that implies the sweet glaze beneath, and a glowing red-pink color that penetrates the surface. Here's a simple recipe for making them on your grill or in your oven.

Makes. 2 servings

Takes. 20 minutes to make the marinade, 1 to 2 hours to marinate, and 3 hours to cook.

- 1 slab babyback ribs
- 1/4 cup hoisin sauce
- 1/4 cup water
- 2 tablespoons brandy (or dark rum or bourbon)
- 2 tablespoons honey
- 2 tablespoons dark soy sauce
- 1 tablespoon toasted sesame oil
- 1 tablespoon hot sauce such as Tabasco
- 2 teaspoons ginger powder
- 2 teaspoons onion powder
- 1 teaspoon garlic powder
- 1 teaspoon five spice powder
- 1/2 teaspoon red food coloring

About the Chinese ingredients. *There are no substitutes for hoisin sauce, five spice powder, or sesame oil. They are responsible for most of what we think of as the flavor of Asian food in the US. Five spice powder is easy to make at home (click the link above for our recipe), but the others are not easily made. Click on the links for more info on these ingredients. If you have trouble finding them in your grocery store, try Amazon.*

About the hot sauce. *If you have an Asian-style chile sauce like gochujang you can use it, but any old hot sauce will work fine in this marinade since it provides more heat than flavor. The recipe above produces mild heat. Add more if you love pain.*

About the food coloring. *Food coloring is necessary for the authentic color. We are told that you can substitute beet root powder for the red food coloring or fermented bean red curd, but I've never tried them. There is very little coloring in this recipe and most is discarded with the unused marinade. There are natural food colorings made from achiote and its seeds, annatto, or cochineal (a.k.a. carmine). If you want to leave it out, the ribs will still be great, but won't have the traditional festive color.*

Optional. *After about 2 1/2 hours, paint the meat with a glaze of honey and roast an additional 30 minutes*

Garnish. *Sprinkle sesame seeds, orange zest, and/or chopped chives or chopped green onions.*

Method

1| Prep. Skin & trim the slab. Cut it into individual bones. Mix the marinade thoroughly in a bowl. Don't skip the booze. It helps penetrate, and even if you're a teetotaler, don't worry, there isn't any measurable alcohol in the meat. Yes, we know alcohol can dry meat out, but we just think it works well in this case. If you must skip it, substitute apple juice or water. You can substitute fresh ginger and garlic for powdered ginger and garlic if you wish.

2| Marinate the meat for 1 to 2 hours in a metal bowl or zipper bags. Don't marinate in a plastic bowl if you use the food coloring. It might stain. Discard the used marinade when you are done—it is contaminated with meat juice.

3| Fire up. As much as we love outdoor cooking, Chinese restaurants don't use smokers, and this meat tastes great cooked in an indoor oven. Either way, heat your cooker or oven to about 225°F in the indirect zone.

4| Cook. Set the ribs on the grill's main cooking grate on the indirect side, making sure the meat is not directly over the flame. If you are preparing them indoors, put a pan of water with a rack on top, then pplace the meat on the rac above the water pan. This is important, or drippings will burn in the pan. Roast for about 3 hours. If you grill, skip the smoking wood for a cleaner taste.

5| Serve. Remove the ribs from the grill, garnish with snipped chives or thinly-sliced green onions, sesame seeds, and orange zest. Serve.

COUNTRY-STYLE RIBS

As explained above, Country-style ribs are not really ribs, they are pork chops. Pork chops and steaks are blank canvases. They love to be painted with herbs, spices, smoke, and sauces. But they can transmogrify from juicy to jerky in just two minutes, so temperature control is especially crucial. Ensure moist and flavorful pork chops every time with this recipe for brined and reverse-seared chops. The “ribs” are then smoked and seared on the grill

for a deep smoky flavor before being finished with a tangy South Carolina mustard BBQ sauce.

Makes. 2 servings

Takes. About 5 minutes to prepare, 2 hours to brine, and about 45 to 60 minutes to cook

- 2 country-style ribs, about 1-inch thick
- 1 teaspoon Morton Coarse Kosher Salt
- 1/8 teaspoon black pepper
- 1/2 cup Columbia Gold BBQ Sauce

About the sauce. *You can use your favorite barbecue sauce, but we've tried them all and our favorite by far is this mustard based sauce. The combo works like peanut butter and jelly. Mustard and pork, especially smoked pork, is common throughout Germany and Eastern Europe (think hot dogs or Polish sausages).*

Method

1| Trim excess edge fat. The fat will not penetrate the meat so there is no reason to leave it on unless you like eating the fat. If you use loin chops, there is a band of fat around the perimeter. Beneath the fat is a thin layer of connective tissue called silverskin. You need to remove it because as it cooks it shrinks and causes the meat to form a cup.

2| Salt. Sprinkle on the salt an hour or two before cooking.

3| Fire up. Set up your grill for 2-zone cooking or fire up the smoker, and shoot for 225°F in the indirect zone.

4| Season the chops with black pepper. You can use a rub, but if you don't overcook these you might find S&P is just enough.

5| Sauce. Put the ribs on the indirect side of the grill, paint both sides with sauce, and let them cook with the lid down. Flip them after *about* 20 minutes and paint them again. After another 20 minutes or so, you should be ready to eat. Please use a good digital thermometer to get them cooked properly, 135°F to 140°F in the center, max. We strongly recommend 135°F. It will be pink, and safe, and you will experience pork as it was meant to be.

OVEN BAKED RIBS

Don't have a smoker or a grill? Live in a condo or dorm? Gutting out a blizzard? Broken leg? This technique makes tender, juicy ribs indoors with a flavor that might fool you into thinking it was cooked outdoors.

In the summer of 2015 our friends, the wizards at ChefSteps.com, invited our Chef Ryan and Meathead to their kitchen/lab in Seattle to show them how we cook ribs outdoors and then for a friendly challenge to make ribs cooked indoors that taste like ribs cooked outdoors.

Both teams used a bit of Prague Powder #1 in their rub. PP#1 is a curing salt that gives hot dogs, corned beef, ham, bacon, and other cured meats their pink tinge. Both teams got a faux smoke ring from it. That's because the smoke ring is not really made by smoke! Click here to read more. PP#1 really doesn't impact flavor, so you can skip it, but if you do choose to add it, you might be able to pass these ribs off as cooked outdoors.

They started theirs *sous vide*, a method of gently cooking in a vacuum pack in a hot water bath and then finished the ribs

in the oven. We baked ours inside in the oven, at first wrapped in foil, then nekkid.

The results? We agreed that our rub was better because it was more balanced and it contained a number of smoked ingredients. In fact, we liked it so much it became the base recipe for our commercial bottled Pork Seasoning.

We also agreed our ribs tasted more outdoorsy because we marinated them for a bit in dilute liquid smoke. We agreed their meat was slightly juicier. If you have a sous vide setup, instead of using foil as we did, do as they did: Cook the ribs sous vide for five hours at 165°F, and then dry roast at 225°F for two hours. Here's a video of the results.

Now a word on liquid smoke. BBQ snobs turn up their noses at the stuff because they get *their* smoke flavor from the cooker. What happens is this: smoke comes off combusting wood and condenses on cool meat. Pretty simple. Well that's

also how liquid smoke is made: Wood is burned, it condenses on cool metal, and then it is bottled. Pretty much the way they make whiskey. So next time you run into a BBQ snob who starts to rant about liquid smoke, snatch that bourbon from his hand.

Makes. 2 servings of 1/2 slab each

Takes. 1 hour to marinate, 4 hours to cook.

- 1 slab of babyback ribs
- 1/2 cup liquid smoke
- 2 teaspoons Morton Coarse Kosher Salt
- 3 tablespoons "smoked" Meathead's Memphis Dust *
- 1 cup smoky barbecue sauce **

Optional. *Add 1/4 teaspoon of Prague Powder #1 to get a faux smoke ring. No more. PP#1 is a preservative.*

*** About the smoked Meathead's Memphis Dust.*** *To amp this up to 11, we make Meathead's Memphis Dust with smoked garlic, smoked onion, smoked salt, and paprika. They are available in some stores or online. If you'd rather not make this rub from scratch you can click this link and buy Meathead's Amazing Smoked Pork Seasoning & Dry Brine instead. It has a number of smoked ingredients. Keep in mind that our bottled rubs have salt in them. When using the bottled rub with this recipe, you do not need to add the salt that is called for in the recipe.*

*** About the BBQ Sauce.*** *You can make our Kansas City Classic Sauce and add about 1/4 teaspoon of liquid smoke to the barbecue sauce* ***after*** *you taste it. If you'd rather not make this sauce from*

scratch you can click this link and buy Meathead's Good Enough To Drink KC BBQ Sauce instead. It has a little liquid smoke in it.

Method

1| Skin & trim. Remove the membrane from the back of the ribs and trim excess fat. Mix 1/2 cup water with the liquid smoke, and marinate the meat in this for an hour. We usually cut the slab in half and put each half in a 1-gallon zipper bag with half the marinade.

2| Season both sides with salt and Prague Powder #1 (if you are using it) an hour or two before cooking. Then sprinkle on the smoked Meathead's Memphis Dust. Wrap the meat in foil. Put it in a pan to catch leaks and put the pan in a 225°F oven for 2 hours. This makes the meat very tender, but not mushy.

3| Roast. Now take the meat out of the foil, and put it back in the oven on a wire rack, meaty side up, and place the wire rack above a pan with a little water to catch drips. Roast for another 2 hours at 225°F. This will firm the bark.

4| Sauce and serve. Use the bend test to make sure it is done. When it is, turn the slab meaty side down. Slather the bone side with the sauce, turn the oven on broil and put the meat under the broiler so it is aligned with the heat source. Broil for 5 minutes until the sauce bubbles, watching closely to make sure it doesn't burn. Repeat for the meaty side. This direct concentrated heat caramelizes the sugar and creates deeper flavors. Serve and be amazed!

STOVETOP RIBS WITH A MEXICAN FLAIR

Pork is a major constituent in the Mexican diet, as are peppers, onions, tomatoes, and rice. This traditional old peasant dish uses them all and elevates itself from everyday fare to fare with flair. Best of all, the ribs are cooked indoors, making it the perfect thing to cook on cold winter days.

We know we said that if you boil ribs the terrorists win, but this recipe (and the next one) work because you are capturing the flavorful liquids that come out of the meat. Nothing is lost.

Makes. 2 servings of 1/2 slab each

Takes. 30 minutes to prep, and up to 2 hours to cook

- 1 slab of St. Louis cut ribs or spareribs
- 1 ancho (dried poblano) pepper
- 6 slices smoked bacon
- 2 ounces cured, smoked ham or Canadian-style bacon
- 2 medium onions
- 3 red bell peppers

- 1 green bell pepper
- 1 jalapeño pepper
- 1 cup tomato sauce
- 1 tablespoon capers
- 12 pimento-stuffed green olives
- 1 teaspoon dried oregano
- 3 teaspoons Chipotle Tabasco
- 1 (19-ounce) can garbanzo beans (chickpeas)
- Salt and pepper to taste

- 2 cups rice
- 1 tablespoon Morton Coarse Kosher Salt

About the ribs. *Do not use babybacks. They are too curvy to brown properly in a pan.*

About the rice. *White rice is the most common, but you can use brown if you wish.*

Method

1| Prep. Cut the ribs into individual bones. Dice the ham, and onion into 1/4-inch cubes. Seed and stem all the peppers and cut into dice. Split the ancho, discard the seeds and stem, and tear it into large flat pieces. Heat a large, deep non-stick frying pan, on medium. Place the ancho pieces in the pan and press them down with a spatula for 30 to 60 seconds, just enough to toast them or until steam rises. Turn the pieces over and repeat. This amps up their flavor. Set them aside, and when they cool, break them into 1/2-inch pieces.

2| Render. Add the bacon to the hot pan and cook until it starts rendering fat.

3| Brown. Turn the heat down to medium. Add the ribs and brown them on both sides.

4| Cook the stew. If the bacon is getting crisp, remove it. Otherwise, leave it in the pan. Remove the ribs and toss in the ham, peppers, and onions. Cook until they are limp, stirring occasionally. Add the tomato sauce, olives, drained capers, ancho, oregano, Tabasco, and the ribs. Reduce the heat to a simmer, just above low. Simmer uncovered. If you are not using a non-stick pan, stir occasionally to make sure nothing is burning on the bottom of the pan. If the liquid gets too thick and too shallow, add a bit of water.

5| Make the rice. After the ribs have simmered for 25 minutes, in another pot, boil four cups water and add the salt and rice. Cover and cook for 30 minutes until ready or follow the directions on the box.

6| Finish. After about an hour the ribs should be tender enough to serve. About three minutes before serving, add the garbanzo beans. Taste and add salt and ground black pepper to taste. Serve by scooping the rice onto a plate and place the ribs and liquid on top. Place a bottle of hot sauce on the table.

SLOW COOKER RIBS AND INSTANT POT RIBS FOR CABIN FEVER

If weather or other impediments prevent you from making the real thing outdoors, you can make pretty tasty ribs in a slow cooker with this recipe. The idea is to braise the meat until very moist and tender, cooking the meat in a closed pot over a low temp in a flavorful liquid. We like to cook up a pot of bowtie pasta or macaroni and serve this on top.

Makes. 2 servings of 1/2 slab each

Takes. 30 minutes to prep, 4 to 8 hours to cook.

- 1 slab St. Louis cut or spareribs
- 2 teaspoons Morton Coarse Kosher Salt
- 1 large onion
- 4 carrots
- 2 medium potatoes
- 1 crunchy apple
- 1 cup Kansas City Classic Sauce
- 1 teaspoon liquid smoke

About the potatoes. *If you wish, try sweet potatoes instead of white potatoes.*

Method

1| Skin & trim. Remove the membrane from the ribs and trim off excess fat. Slice the rack into 2 to 3 sections. Sprinkle with salt.

2| Brown is beautiful. If you have a broiler, place the meat about 6 inches under the broiler for about 15 minutes per side, or until brown. Keep an eye on the ribs because they can start smoking under a very hot broiler. If you don't have a broiler, you can brown them in a pan with a little oil. In an instant pot you can brown the meat in the pot. Otherwise, don't sweat it. The little bit of flavor added by browning will not be missed.

3| Doctor the sauce. Mix the liquid smoke with the barbecue sauce.

4| Slice and dice. Slice the onion into slivers. Peel the carrots and cut them into bite-sized pieces. Peel the potatoes and cut into bite-sized chunks. Peel the apples and chop into bite-sized chunks. Don’t do this slicing and dicing until after the ribs have been browned or the apples and potatoes will oxidize.

5| Cook. Line the bottom of the slow-cooker with the onion slices, carrots, apples, and potatoes. Place a layer of ribs on top, meaty side up. Pour some of the sauce over the ribs and spread out to coat the surface with a brush or spoon. Place

another layer of ribs on top of the first layer and spread on more sauce. Keep going until all the ribs are in and sauced.

6| Cook. In a slow-cooker, cover and cook on low (about 200°F) for 6 to 7 hours or on high for 3 to 4 hours. In an instant pot, pressure cook for about 45 minutes. When it's done you will notice that the sauce is not as thick as when you started. A lot of the juices from the meat and other ingredients will be extracted and you'll have a rich, but runny sauce. If you have a stovetop, you can pour off the sauce and cook it down to thicken, but we never bother. The thin sauce is concentrated in flavor and delicious.

7| Serve. If you made pasta, plate it first, then divide the meat and other stuff between the diners, and pour the sauce on top.

THE ULTIMATE MCRIB SANDWICH

Why wait for the ground pork McRib burger to return when you've got an amazing *real* rib sandwich recipe? Ribs are smoked to perfection before the meat joins homemade pickles, caramelized onions, and BBQ sauce on a buttery brioche bun. This recipe calls for leftover

babybacks. We know, you never have leftovers, but the next time you make a slab of Last Meal Ribs, make an extra.

Makes. 3 sandwiches

Takes. 20 minutes if you goof off during the process, an hour if you caramelize the onions

- 1 slab leftover cooked Last Meal Ribs
- 1 large onion
- 9 sandwich pickle slices
- 2 tablespoons butter
- 3 quality buns
- 6 tablespoons of your favorite BBQ sauce

About the ribs. *You can use either babybacks or spareribs or St. Louis cut.*

About the pickles. *You can buy your favorite pickles, or better still, make them yourself. It's easy.*

About the buns. *We like a serious bun like a brioche bun or pretzel roll, as in the picture at the top of the page. Click the link for a recipe for making your own brioche burger buns. We even make ours on the grill!*

Method

1| Prep. You have a choice. You can chop the onion and serve it raw on the sandwich, or you can cook it. Or both! You can just lightly cook the onion in a pan with in some butter, or grill it, or you can slowly caramelize it. Caramelizing makes

the onion into a sweet relish that can obviate the need for sauce. Click the link for instructions. Meanwhile, take the butter out of the fridge so it can soften and be easier to spread.

2| Slice the rib slab into individual bones, and carefully run a sharp knife along the bones to remove the meat, trying not to hack off any cartilage. Then chop the meat into 1/2-inch chunks. Reheat the meat in a microwave. This will warm it up quickly with minimal moisture loss.

3| Butter and toast. Butter the buns and toast under a hot broiler to add crunch. This is an important step.

4| **Assemble**. Create the sandwich by placing a heaping scoop of chopped meat on the bottom bun and top with 1 or 2 tablespoons of sauce. Top with onions and pickles. Plate and serve immediately.

MORE RIBS RECIPES

We wanted to give you a taste of a wide variety of rib styles in this book, but there are more things one can do with this delicious and versatile cut. Here are a few more of our growing list of recipes all available on AmazingRibs.com:

Bacon Wrapped Spareribs Will Blow Your Mind

Ribs With Soy Ginger Sauce

Epic Candied BBQ Ribs Recipe

Maple Glazed Ribs

Perfect Sous Vide Que Smoked St. Louis Spareribs

Rib Tips Are The Best Treats, No Tricks

Rendezvous Ribs: Ribs in a Hurry

Tuscan Marinated Ribs Griglia

Chinese Five Spice Riblets

SIDE DISHES

Be sure to check out AmazingRibs.com's many tested side dish recipes including:

Check out our potato salad recipes

Check out our mac-and-cheese recipes

Check out our recipe for the best grilled corn on the cob ever

Check out our regional beans recipes

Check out our veggie, salad, and slaw recipes

Check out our awesome grilled asparagus recipe

Check out our cornbread, garlic bread, and other bread recipes

Snacks and munchies anyone?

and soooo many other wonderful tested recipes

PART VIII
CHECK THIS OUT

Here are some goodies from AmazingRibs.com

MEATHEAD'S AMAZING SEASONINGS & DRY BRINES

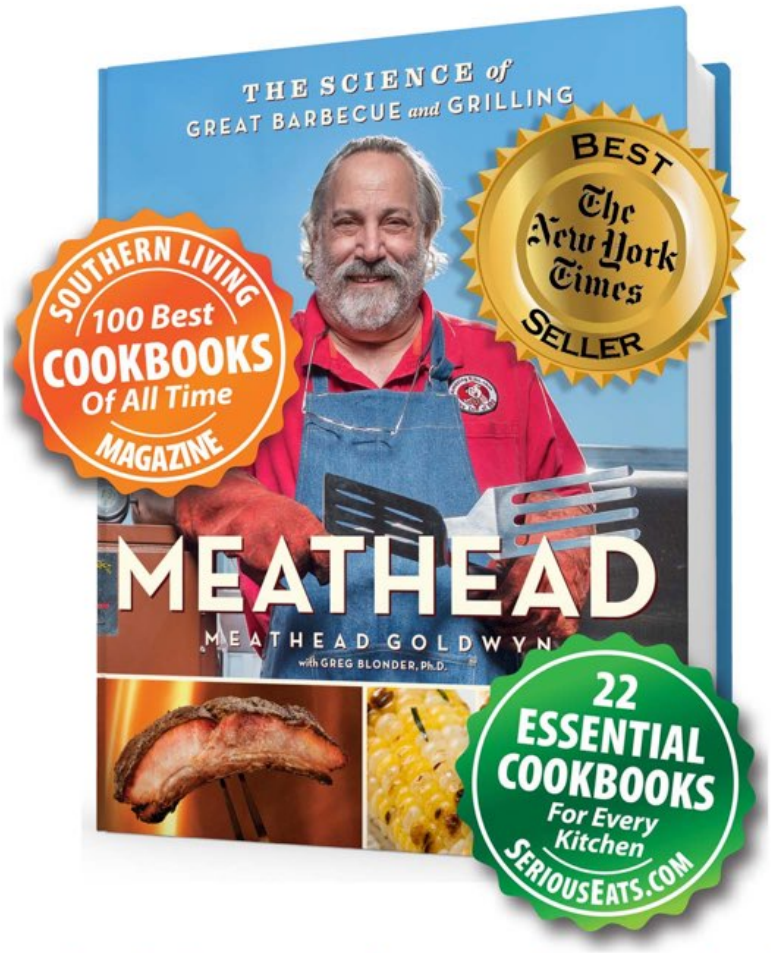
Many meals ago, in 2005, my neighbor challenged me to a rib cookoff. I won, got a swelled head, and built a website to share my "secrets." Now, according to Forbes, Meathead's AmazingRibs.com is "By far the leading

resource for BBQ and grilling information" and I am in the Barbecue Hall of Fame.

Since I founded the site in 2005 I have shared more than a dozen of our favorite rub and sauce recipes for free, like the ones on the previous pages, and they have become hugely popular. All of them have won big bucks in competitions and been used in restaurants. Finally, after 16 years, in November 2021, we listened to your requests and created three bottled rubs and a sauce under the name "Meathead's Amazing." They are based on our free recipes, but have several new ingredients and changes.

Why there is salt in these rubs? When you make rubs at home, we recommend you do not add salt because salt penetrates and none of the other spices and herbs do, so thick cuts need more salt. We put salt in these bottled rubs because all commercial rubs have salt and without salt the price would be outlandish. Also, without salt buyers would wonder why their food needs salt. You can still use these as a dry brine, just sprinkle the rub on well in advance to give the salt time to penetrate. For very thick cuts of meat, we recommend adding a bit more salt. Click here to order them.

Get a free Deep Dive Guide
with each purchase



Meathead, The Science of Great Barbecue And Grilling

"100 Best Cookbooks Of All Time" Southern Living

New York Times Best Seller

3,047 ratings on Amazon ★★★★★

Meathead's
AMAZINGRIBS.COM FOOD TEMPERATURE GUIDE
"By far the leading resource for BBQ and grilling information" Forbes

Beef, Lamb, Venison, Duck Breasts (Steaks, Chops, Roasts) - USDA Minimum 145°F (63°C)			A
Blue, "Pittsburgh"	110-120°F (43-49°C)	Dark purple, cool, stringy, slippery, slightly juicy	
Rare	120-130°F (49-54°C)	Bright purple to red, warm, tender, juicy	
CHEF TEMP Medium Rare	130-135°F (54-57°C)	Bright red, warm, tender, very juicy	
Medium	135-145°F (57-63°C)	Deep pink, yielding, juicy	
Medium Well	145-155°F (63-68°C)	Slight pink, some tan, firm, slightly fibrous, moist	
Well Done	155°F (68°C) or more	Tan to brown, no pink, chewy, dry	
Pork, Raw Ham, Veal (Steaks, Chops, Roasts) - USDA Minimum 145°F (63°C)			A
Rare	120-130°F (49-54°C)	Pale pink center, warm, tender, slightly juicy	
Medium Rare	130-135°F (54-57°C)	Creamy pink color, bouncy, very juicy	
CHEF TEMP Medium	135-145°F (57-63°C)	Cream color, some pink, yielding, juicy	
Medium Well	145-155°F (63-68°C)	Cream color, firm, slightly juicy	
Well Done	155°F (68°C) or more	Cream color, tough, dry	
Chicken, Turkey (Whole Or Ground), Including Stuffing - USDA Minimum 165°F (74°C)			A
SV TEMP Medium Well	150-155°F (66-68°C)	Cream color white meat, pale tan dark meat, tender	
CHEF TEMP Well Done	160°F (71°C)	Cream color white meat, pale tan dark meat, firm	
Ground Meats & Raw Sausages - USDA Minimum 160°F (71°C)			A
SV TEMP Medium	145°F (63°C)		
Grill or pan fry these risky meats to	160°F (71°C) and make them juicy by using a 20 to 30% fat blend		
Tuna - USDA Minimum 145°F (63°C)			A
CHEF TEMP Rare	120-125°F (49-52°C)	Bright reddish purple	
Other Fin Fish - USDA Minimum 145°F (63°C)			A
CHEF TEMP Medium Rare	125-135°F (52-57°C)	Slightly translucent, flaky, tender	
Lobster, Crabs, Crawfish, Shrimp, Scallops - USDA/CHEF/SV TEMP When opaque 131°F (55°C)			A
Hams, Hot Dogs, Precooked Sausages - USDA Minimum 140°F (60°C)			A
CHEF & SV TEMP Warm	140°F (60°C) or more	Tender, juicy	
BBQ/Roasted Ribs, Shoulders, Briskets, Legs, Rumps - USDA Minimum 145°F (63°C)			B
CHEF TEMP Tender, Tugs Apart	203°F (95°C)	High in fat and collagen, best cooked low and slow	
Clams, Oysters, Mussels - USDA/CHEF/SV TEMP When shells open			
Leftovers - USDA/CHEF/SV TEMP Minimum 165°F (74°C)			

Other Useful Temperatures

0°F (-18°C) Best freezer temperature.
25°F (-4°C) Meat freezes.
32°F (0°C) Water freezes.
34-39°F (1-4°C) Best refrigerator temperature.
41-130°F (5-54°C) Danger zone in which many pathogenic bacteria grow.
130-135°F (54-57°C) Medium rare, most meats are most tender and juicy.
131°F (55°C) Most pathogenic bacteria begin to die. Minimum sous vide temp.
135°F (57°C) Connective tissues begin to contract and squeeze out pink juice.
150-165°F (66-74°C) Large cuts at low temps stall and do not rise for hours.
160°F (71°C) Soft boiled eggs.
160-165°F (71-74°C) Instant kill zone. Most pathogens die in seconds.
160-205°F (71-96°C) Collagens melt, form gelatin, making meat succulent.
170-180°F (77-82°C) Custards begin to set.
173°F (78°C) Alcohol begins to boil.
180-185°F (82-85°C) Water begins to simmer.
185°F (85°C) Custards begin to break.
190-200°F (87-93°C) Most breads are done baking.
210°F (100°C) Baked potatoes are fluffy.
212°F (100°C) Sea level boiling point. Subtract 2°F every 1000' above.
225°F (107°C) Best temp for low & slow roasting tough cuts of meats - 8.
310°F (154°C) Maillard browning accelerates.
325°F (163°C) Minimum cooking temp for browning poultry skins.
425°F (281°C) Teflon thermometer cables can melt.
450°F (232°C) Teflon pans can emit toxic gases.
500-700°F (299-399°C) Hardwoods start to smoke.
700-1000°F (399-538°C) Hardwood gases produce flame.

Fats & Oils

95-130°F (35-54°C) Animal fats start to soften and melt.
300°F (149°C) Butter starts to smoke.
325-375°F (163-191°C) Extra virgin olive oil begins to smoke.
350-375°F (177-191°C) Best oil temp for most deep frying.
361°F (183°C) Some animal fats begins to smoke.
370°F (185°C) Lard begins to smoke.
375-400°F (190-205°C) Virgin avocado oil begins to smoke.
390°F (199°C) Grapeseed oil begins to smoke.
400°F (204°C) Canola oil begins to smoke.
400-450°F (205-230°C) Vegetable oil begins to smoke.
440°F (227°C) Inexpensive olive oil and sunflower oil begin to smoke.
450°F (232°C) Peanut oil, corn oil, soybean oil begin to smoke.
482°F (250°C) Ghee begins to smoke.
510°F (265°C) Safflower oil begins to smoke.

Sugar

217-222°F (103-106°C) Target temp for most jams and jellies.
230-234°F (110-112°C) Thread Stage. Sucrose (table sugar) melts and makes syrup. Fructose starts to caramelize.
235-240°F (113-116°C) Soft Ball Stage. For fudge, pralines.
244-250°F (118-121°C) Firm Ball Stage. For caramels.
250-265°F (121-130°C) Hard Ball Stage. For nougat.
270-290°F (132-143°C) Soft Crack Stage. For taffy.
300-310°F (149-154°C) Hard Crack Stage. For brittles, lollipops.
320-350°F (160-177°C) Clear Liquid Stage. Caramelizes.
350°F (177°C) Burnt Sugar Stage. Starts to burn and tastes bitter.

SOUS VIDE (SV) RULES OF THUMB

These times and temps are **starting points** that will produce meats that please. Experiment!

A - TENDER CUTS

1 - Cook. Salt, then sous vide for 2-4 hours at the temp at left.

2 - Optional. Chill thoroughly in the bag.

3 - Rub. Remove from bag, pat dry, sprinkle generously with salt-free rub or lightly with salted rub.

4 - Finish. Sear in a hot pan, griddle, or on a grill until you like it, or smoke at 225°F (107°C) and then sear. Bring to the temp at left. Glaze or sauce if you wish.

B - TOUGH CUTS

1 - Cook. Salt, then sous vide at 145°F (63°C) for about 24 hours.

2 - Optional. Chill thoroughly in the bag.

3 - Rub. Remove from bag, leave wet, sprinkle generously with salt-free rub or lightly with salted rub.

4 - Roast or smoke. Roast or smoke at 225°F (107°C) until 145-155°F (63-68°C).

5 - Optional. Thoroughly dry the surface. Sear in a hot pan, griddle or on a grill. Glaze or sauce if you wish.

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