

Basic Meat Science For Outdoor Cooks

"My foe, my enemy, is an animal. In order to conquer him I have to think like an animal and, whenever possible, to look like one. I've got to get inside this dude's pelt." Carl Spakler (Bill Murrey) in Caddyshack, 1980

As meat is heated, it undergoes physical and chemical changes called denaturing, and as scientific as this process is, it is also magic. It is a complex process, but a basic understanding is the first step in making an omnivore's delight. So stop worrying about your dinner and start thinking about it.

What is meat?

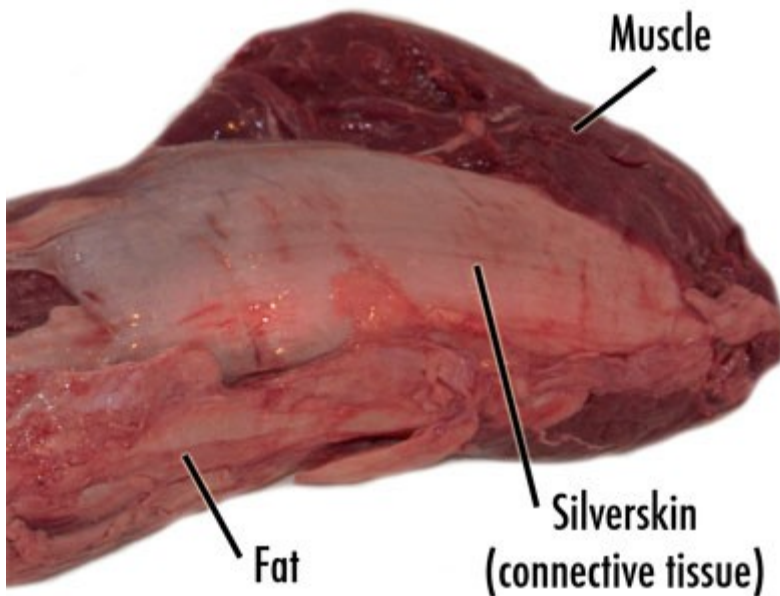
Technically, meat is cut from the muscles of mammals and birds. For some reason, fish muscle is not considered meat, but it should be. Lean muscle tissue typically breaks down like this: Water (about 75%), protein (20%), fats (5%), carbohydrates (1%), and vitamins and minerals (1%).

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al	Water	Protein	Fat	Other
Beef	72	21	6	1
Pork	69	20	10	1
Chicken	73	21	5	1
Lamb	73	20	5	2
Cod	81	17	1	1
Salmon	64	21	14	1

Other cuts can vary significantly. Shoulder meat tends to have a lot more fat and connective tissue. Pork rib meat, for example, is more like 65% water, 18% protein, 15% fat, and 2% sugars and minerals.

Beef Tenderloin



Muscle cells. Muscle cells are about the thickness of a human hair and are surrounded by a sheath of thin diaphanous connective tissue that attaches the muscle cells to each other to form bundles called muscle fibers and bundles of bundles called *myofibrils*. Muscle cells are mostly protein and water. The proteins are mostly *myosin* and *actin*, which react differently to heat. As the

animal ages, grows, and exercises, muscle fibers get thicker and tougher. So do the connective tissues.

Connective tissues. Connective tissue is most obvious in the form of ligaments that connect muscles to bones. It is also visible as the thin shiny sheathing that wraps around muscles called silverskin. These tougher, chewier connective tissues are appropriately named *elastin*. A softer connective tissue called *collagen* is invisibly scattered throughout the muscle. When you cook, collagen melts and turns to a rich liquid called *gelatin*, the same stuff Jell-O is made from. This gives meat a wonderful silky texture and adds moisture. Lean meats like loin, tenderloin, and poultry don't have much collagen. When cooking tough cuts of meat with lots of connective tissue, like ribs and shoulder, it is important to liquefy connective tissue into gelatin. After it melts, as it chills, gelatin can solidify into that jiggly stuff which, with a little processing, can then be served at bridge clubs.

Fat. Fat is the fuel that powers muscles. It is packed with calories. Meat can have large visible hunks of fat, threads of fat, and small bits of fat. Meat with lots of threads of fat woven amongst the muscle fibers is called *marbled* because it has a striated look similar to marble.

Fat is crucial to meat texture. Waxy when it is cold, at about 130 to 140°F fat starts to melt and lubricate the muscle fibers just as they are getting tougher under the heat. Fat does not evaporate when you are cooking as does water.

Fat is also the source of much of the flavor in meat. It absorbs and stores many of the aromatic compounds in the animal's food. As the animal ages the flavor compounds build up and get stronger. After the animal is slaughtered, the fat can turn rancid if stored too warm 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.

Animal fats are the subject of a great deal of debate among doctors and dieticians. For many years they were thought to be dangerous and to be avoided. It is now known that fats contain many beneficial properties, and some

argue that, in moderation, animal fats are essential for health. A great deal of interesting research on the subject is going on as I type this.

Fluids. Most of the liquid in meat is protein laden water called *myoglobin*. The reddish color in meat and its juices *is not caused by blood*. That was pretty much all drained out in the slaughter house. If the stuff on your plate when you slice a steak was blood, it would be much darker, 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?

Slow twitch vs. fast twitch muscles

Muscle fibers need fat and oxygen for fuel. The fat comes from the animal's food that has been converted to fatty acids in blood. The oxygen is carried by the protein *hemoglobin* in the blood stream. Hemoglobin hands the oxygen to myoglobin, the pink protein liquid that travels through the muscle and passes it to the fibers.

In general, the more exercise a muscle gets, the tougher it is, the more oxygen laden myoglobin it needs, and the myoglobin turns the meat darker and makes it more flavorful. Dark meats, like chicken thighs are made of "slow twitch" muscles designed for slow steady movement and endurance, and are loaded with juicy myoglobin. White meats, like chicken breasts, are mostly "fast twitch" muscles, designed for brief bursts of energy, and have less myoglobin. Dark meats also have more fat for energy.

When cooked, slow twitch muscles have more moisture and fat and are more flavorful than white meat. White meats contain less moisture and fat, and so it dries out more easily when cooking. The legs and thighs of chickens and turkeys get more exercise standing, walking, and running, so they have lots of slow-twitch muscles, more pigment, more juice, more fat, and more flavor. They are also slightly more forgiving when being cooked. Modern chickens and turkeys have been bred for large breasts because white meat is more popular in this country (and I for one, can't understand why).

Ducks and geese are designed for flying and swimming and they get more exercise, so they have more dark meat. Duck breasts are almost the same color as beef.

Small fish swim with quick darting motions have mostly fast-twitch muscles and white meat, but tuna swim long distances with slow steady tail movements are so they are mostly red meat.

Modern domestic pigs have been bred to have less intra-muscular fat for a health conscious society, and they don't get much exercise, so they have become "the other white meat".

Beef is all pretty much the same color, but slow twitch muscles like flank steak have bigger richer flavor.

Buying meat

Lean in and I'll tell you the secret to eating well: Get to know your butcher.

In my book, knowing a good butcher is more important than knowing a good stock broker. That's my favorite butcher at right wearing an AmazingRibs.com cap, **Dario Cecchini** in his 200-year-old butcher shop in Panzano-in-Chianti in Italy. OK, I don't see him often, but I do know the head butchers at all three groceries near me, and they know me, too.



In my blue-collar neighborhood in a suburb just west of Chicago there used to be many butcher shops. The big grocery stores and the big department stores that carry meat, like Walmart, have put them all out of business. In the past decade I have lost two great butcher/craftsmen to the big box stores, Hermann Zanoni and Dennis Morini.

Many grocery stores get their meat shipped to them pre-cut and packaged from a central warehouse. But many still have butchers on premise. Find them. The head butcher is usually on duty early morning through early afternoon. Stop at

the counter and ask for the head butcher and the assistant. Don't be surprised if they are women. Introduce yourself. Chat them up. Swap recipes. Tell them about AmazingRibs.com. Get the phone number of the butcher department. Ask them about their favorite cuts and what they think are some of the best meats they get. Ask if they can special order USDA Prime grade beef or less popular cuts like beef tri-tip or whole packer briskets. Set yourself apart from the crowd.

Many big grocers get fresh meat every day, but some don't. Ask about delivery dates and times. Unless you're on the coast, fish is usually not delivered daily and freshness is more important in fish than any other meat. Then, one day, bring in a slab of ribs you're proud of and leave it for the butcher staff to enjoy with lunch. Show them you've got the goods.

Soon after you meet them, while they can still taste those ribs, call in an order. Normally they don't cut ribeyes 1 1/2" thick, and I think that's the best size, so order some. Don't be in a hurry. My butcher has been known to set aside the pick of the litter for me even when it is on sale, but be willing to pay full price for the best cuts.

Not all meat is the same. Get to know your meat cuts and grades but don't be afraid to ask your butcher for help. Baby backs cost more than spare ribs, but spare ribs are usually richer and juicier because they have more marbling and more connective tissue. But baby backs have better marketing (remember the Chili's jingle?). Filet mignon is the most tender beef cut, but ribeye is the most flavorful. I've written articles on **the different cuts of beef** and **the different cuts of pork**. In addition, beef is graded and those grades are important to know. Read my article about **beef grades**.

Pick meat carefully. Meat needs to be stored cold, just a few degrees above freezing. Open top display cases work fine, but the bottom pieces may be cooler than the top pieces. Compare the different packages.

Look for liquid in the package. This is called purge and is often a sign that the meat has been frozen and thawed. This moisture and flavor cannot be replaced. Avoid meat with a lot of purge.

Pay attention to the dates on packaging. "Sell By" date tells the store when to remove products from the shelf. "Best If Used By" or "Use By" dates tell you when you should eat or freeze the product. These dates are not related to safety, just quality. And you can no longer rely on the color of meat if it is prepackaged because some grocers now sell red meat packed in a carbon monoxide atmosphere to prevent browning. Remember, the dates are meaningless once the package has been opened and exposed to air and bacteria.

There are a few days right after slaughter when *rigor mortis* makes the meat tough, but that is gone by the time the meat arrives in your store. As meat ages, enzymes and oxidation changes the flavor. Pick the most recently cut meats. Read the dates on the labels (if there are any). Yes, beef *can* improve with aging, but it has to be aged properly. Beef seems to be best after about 30 days if it is packed in Cryovac, that thick vacuum sealed plastic. It will not keep that long if it is just shrink wrapped onto a styrofoam tray with air inside. Here's an article with **more on aging beef**. For pork, poultry, and most other meats, the fresher the better.

Read the fine print when you shop. Try to avoid meats labeled "enhanced", "flavor enhanced", "self-basting", "basted", "pre-basted", "injected", or "marinated". They can have salty fluids injected, as much as 10 to 15% by weight. Why pay 10 to 15% more for salt water? In addition, kosher meat has been heavily salted in the koshering process and although the salt is rinsed off the surface, much of it seeps in. Many of these salted meats feel mushy when cooked because the salt denatures the proteins. You do not need these additives if you prep and cook the meat properly. If you want salt, you can add it yourself. If you cannot find a butcher who sells unenhanced meat, ask if he or she can special order it for you.

Shop safely. An E-coli population can double every hour at room temp. Make grocery shopping your last stop when you're out running errands so groceries do not sit in your car any longer than they have to, and in the grocery, make the meat counter the last stop. Put meat in the coolest part of your car. If your

grocery is more than 30 minutes from home, on hot days bring an insulated box or bag for carrying refrigerated products.

For more, read [my article on food safety](#) for tips on shopping for meat that won't kill you or your guests.

Freezing meat

Use or freeze meat soon after you get it home. Have you noticed what happens when you thaw frozen meat? It can purge a lot of juice. That's because freezing forms sharp ice crystals that break open meat fibers. When those juices escape and there's no way to get them back in. You end up with dry meat. That's why fresh meat is usually juicier than frozen meat. Frozen meat can be fine, especially if it is flash frozen, a process that freezes it so quickly that the crystals remain small, do less damage, and create less purge.

If you must freeze meat, keep in mind that air is the enemy. Oxygen can speed degradation of fats, introduce odors, and it can promote discoloring and chemical change from freezer burn. I highly recommend vacuum devices like the **FoodSaver** products. You place food in a plastic bag, insert the open edge into the machine, and it sucks out the air and seals the bag. It can double or triple the time food stays fresh tasting in the freezer. If you don't have one of these nifty gadgets, put in a zipper bag and squeeze out the air by slipping it into a pot of cold water and let the water pressure push out the air. Then zip the bag. This method takes a little practice, but it works great. If you don't have zipper bags, take the meat out of those plastic trays and rewrap it tightly with plastic wrap and then with foil. Plastic wrap alone is permeable and will allow moisture to escape and air in.



Another important step is to freeze the meat rapidly so there are smaller ice crystals than if you freeze it slowly. To freeze meat most rapidly, bag it and remove the air and submerge it in icewater for a few hours. Water is a great conductor of heat and it will chill the meat quickly to just above freezing. Then place it on a rack in your freezer so there can be airflow all around. Then wrap

it tightly in foil. Frozen beef will stay pretty fresh tasting for six months or so, while pork, lamb, fish, and poultry can start tasting funky after 3 months or so.

To defrost it rapidly, put it in a sink or bucket or beer cooler with cold water and change the water every 30 minutes or so. Click here to read [my article about thawing foods](#).

What kind of grill or smoker should you buy?

There are five heat sources for cooking outdoors: Hardwood, hardwood pellets, hardwood lump charcoal, charcoal briquets, gas, and electric. Each produces a different flavor, and each has its strengths and weaknesses.

Hardwood is tricky and requires the right kind of cooker, the right kind of wood, and lots of practice. Controlling temperature is difficult. Most "stick burners" as they like to call themselves, start the wood burning off to the side, let it burn down to glowing embers, and cook with them. A few cook with logs. If you don't get it right, you'll waste a lot of food. It is easy to burn your meal and easier to make it taste like an ashtray full of cigarette butts. Most backyard cookers cannot burn logs. But there are **some big rigs** that do. You

never want to burn softwood or resinous wood like pine because the sap burns



Charcoal briquets



Lump charcoal

very hot and the flavors are not very tasty. Some are hazardous. I recommend you use other methods.

Hardwood pellets, on the other hand is about the easiest method going. These newfangled cookers are modern marvels. The fuel is sawdust that is compressed into little rabbit pellet sized chunks no thicker than a pencil and less than 1" long. The pellets are fed into a burn pot and ignited. The amount of pellets and the oxygen supply are regulated by a digital controller. Set it and forget it. And the food tasted beautiful, although some owners complain that it is not as smokey as they like it. As counterintuitive as this seems, the subtle smoke flavor is because the wood combusts so thoroughly and efficiently. Click here for more about **pellet grills and smokers** as well as a buyer's guide.

Hardwood lump charcoal is made by an ancient process of partially burning hardwood scrap from the lumber mills until it carbonizes. The results are irregular shaped lumps that produce a lot of smoke and excellent flavor. Alas, the flavor is not consistent from bag to bag.

Charcoal briquets are made from hardwood sawdust from lumber mills cooked and partially burned to create char that is compressed into little uniform pillows. They are extremely consistent in their burning properties and flavor, and relatively cheap. I highly recommend them, especially in combination with **smoke producing hardwood chips, chunks, and pellets**. To learn more about the production process of both briquets and lump, read my article on the **Zen of Charcoal**. Click here for a buyers guide to **charcoal grills**, and here for a buyer's guide to **charcoal smokers**. Click here for an article on **setting up a charcoal grill**.

Gas comes in two forms, bottles of liquid propane, and piped in natural gas. The flavor is similar. Gas grills and smokers are extremely easy to use and produce good flavor, especially when combined with **hardwood chips, chunks, or pellets**. Gas grills are the most popular because they fire right up and require little cleanup. For more about how gas grills work, their strengths and weaknesses, read my article on **gas grill setup**.

Electric grills use a heating element that glows as electricity passes through it, sort of like a giant lightbulb. The glowing element generates heat that cooks the meat. Because there is no burning, there is no cellulose, lignin, char, or even oxygen combusted, there are no combustion gases. There is no smoke, and so there is no smoke flavor. The great advantage is that electric heat is very easy to control, and because there is no fire, it is allowed on most apartment balconies that forbid other grills. You can use sawdust and wood chips with some electric grills, and get a nice smoke flavor, but it is different from other smoke flavors.

Click here for the final answer on **which is better, gas or charcoal**. When you get your grill or smoker, click here to learn **how to break it in and how to calibrate it**.

Why low and slow rules

The hotter you cook meat, the more the muscle fibers shrink and the tougher the meat, so in general, it is best to cook meat low and slow. Speed kills. Most of us cook way to hot. Probably a guy thing.

Imagine you are trying to catch a bus. But the bus never stops. You have to jump on while it is moving. If the bus is moving fast, you have a fraction of a second to

jump through the door before it is gone. If it is moving slowly, you have a few more moments to board. Now imagine you want a steak at medium rare, at 130 to 135°F in the center, the temp at which it is most tender and juicy. If you cook over a very hot fire, say 500°F, the window of opportunity when your



steak is right at your target temp is very small. It motors on by. If you have six steaks on at once, you had better move fast to get each one off at the proper temp, even if you have a really accurate fast reading digital thermometer to help you. But if you cook at a cooler 225°F the duration of time at which the meat is in the medium-rare range is longer.

This is the theory behind *sous vide* cookery. Meat is put in a plastic bag and the air sucked out. The bag is submerged in 130°F water. It slowly heats to 130°F and cannot go beyond. You can hold it there for hours. No chance of missing the bus. The bus is not moving.

The problem with sous vide and low temp cooking, is that you don't get good browning on the surface because the Maillard effect really does its thing best at 310°F and higher. The solution is to cook the meat **indirect**, low and slow, and then sear the outside just before serving, called the **reverse sear**, sear in the rear, or red neck sous vide.

There are other reasons to cook low and slow. Heat moves from the outside of the meat to the center by conduction. It's like a bucket brigade. The molecules on the surface get warm and they warm the ones adjacent to them and on it goes until the center is warm. But it takes time. If you use high heat, the exterior can burn before the center gets warm, and you get a rainbow of colors from outside in. On a steak the exterior will be dark, then there is a layer of brown, then tan, then pink, and finally a small layer of medium rare. But if you heat it slowly you can get a much more even color throughout.

That's why the outdoor cook must understand and master **2-zone and indirect cooking**. This is a technique where you have part of your grill hot and part of it not so hot, and you move the meat from one zone to the other.

Proper serving temp

The higher the internal temp the meat achieves, the more water it squeezes out and the drier it

Meat	Serving Temp	Doneness
Beef and Lamb Steaks, Chop, Roasts, and Rack Steaks		
Rare	110-120°F (40-49°C)	Dark purple-red center, cool, stringy, slippery, slightly pinky
Rare	120-130°F (49-54°C)	Slight purple-red center, tender, juicy
Chaf Temp: Medium-rare	130-135°F (54-57°C)	Slight red center, tender, juicy
Medium	135-140°F (57-60°C)	Multiple centers, pinkish, slightly juicy
USDA Temp	145°F (63°C) + 3 mins	Two red pinky pink centers, slightly firm, some juice
Medium-well	155-160°F (63-71°C)	Two red/pinkish pink centers, little stringy texture, some juice
Well-done	more than 160°F (71°C)	Two to brown centers, no pink, stringy, little juice
Pork and Veal Steaks, Chops, and Roasts		
Rare-raw	110-120°F (40-49°C)	Slight pink center, cool, stringy, slightly pinky
Rare	120-130°F (49-54°C)	Pale pink center, warm, tender, very juicy
Medium-rare	130-135°F (54-57°C)	Orange-pink colored, tender, juicy
Chaf Temp: Medium	135-140°F (57-60°C)	Cream-colored, some pink, pinkish, juicy
USDA Temp	145°F (63°C) + 3 mins	Cream-colored with light pink, pinkish, firm, juicy
Medium-well	155-160°F (63-71°C)	Cream-colored firm, stringy, juicy
Well-done	more than 160°F (71°C)	Cream-colored tough, stringy, juicy
Burgers, Meat Loaf, Ground Meats, and Sausages		
USDA Temp	160°F (71°C) or more	except chicken and turkey
Pork ribs, pork shoulders, beef brisket, all cooked low & slow at 225°F (107°C)		
Chaf Temp	160-200°F (70-90°C)	Pink white center, tender, soft, saucy, slow juices
Pheasant, duck, and other game birds		
Chaf Temp: USDA Temp	145°F (63°C) or more	Pink area, stringy, tender, juicy, flavorful
Chicken and Turkey whole or pieces		
Chaf Temp: USDA Temp	165°F (74°C) or more	Cream-colored, slightly tender, clear juices, moist
Fish		
Rare	110-120°F (40-49°C)	Pink area, slippery, slight resistance, firm
Medium-rare**	120-130°F (49-54°C)	Slender, firm, tender, little pink, slightly slippery
Chaf Temp: Medium	135-140°F (57-60°C)	Slightly translucent, firm, tender, white, flaky
USDA Temp	145°F (63°C) + 3 mins	Slightly translucent, firm, tender, white, flaky
Medium-well	155-160°F (63-71°C)	Opaque, completely done
Well-done	more than 160°F (71°C)	Opaque, white, firm, dry
Eggs		
Soft-boiled/poached/soft-boiled	145°F (63°C)	White has just turned white, yellow is tender and luscious
USDA for soft-boiled	160°F (71°C)	Soft white and yolk
Wild Game		
Wild Game (deer, rabbit, squirrel, etc.)	160°F (71°C)	White has just turned white, yellow is tender and luscious
Wild Game (wild turkey, quail, etc.)		
Wild Game (wild turkey, quail, etc.)	160°F (71°C)	White has just turned white, yellow is tender and luscious

gets. In general, most meats are juiciest and most tender when cooked to 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 and they need to be cooked to 160 or 165°F internal to kill the bugs.

Meats with a lot of connective tissue such as pork ribs or pork shoulder are too tough at these lower temps. They need to go up to 190 to 200°F in order to gelatinize collagens and melt fats. That's well past well done, and yes, water is lost, but the melted gelatin and fats lube the meat and make it 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. **The good news is that resting meat is an old husband's tail and it does little to improve juiciness.** For more about ideal serving temps, read **my detailed meat temperature guide** with handy printout for your fridge.

Brown is beautiful, black is bad

As meat cooks, the most magical transformation 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 really really yummy. Who doesn't love the crusty exterior of a



slice of roast beef or the crust on a roasted marshmallow? We don't think twice about it, but that brown on the surface of a steak is hundreds of compounds that are created when heat, especially heat above 310°F, starts changing the shape and chemical structure of the amino acids and sugars on the surface of the meat. The Maillard effect can also be seen in the crust of bread, a toasted

English muffin, roasted coffee beans or chocolate, and even on stir fried veggies.

What you don't want is black meat. Let it go too far and it turns to carbon.

Carbonized meat may be unhealthy.

Pretty in pink

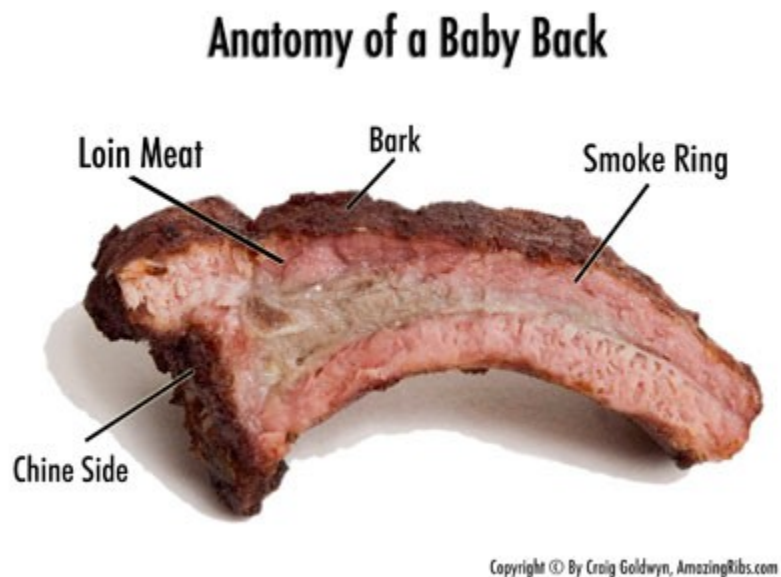
Many smoked meats develop a smoke ring, a bright pink color just under the surface. Some people think the pink color means the meat is raw, but nothing could be further from the truth.

Nitrogen dioxide (NO₂) is among the compounds formed in the high heat

combustion of wood, charcoal, and even propane. As these compounds land on the surface of meat, especially cool moist meat from the fridge, some, including nitrogen dioxide, are moved deeper into the meat as cells lower in the smoke compounds pull them in with a diffusion and absorption process. The cells are simply seeking equilibrium. The process is the same as when someone lights a cigar in a room. All the smoke starts out near the cigar, but eventually it spreads throughout the room as it achieves equilibrium. After a while it penetrates clothes, furniture, and even food. Because it is water soluble, cigar smoke will get into wet things first, like your wife's eyes. Before long you and your cigar will be seeking equilibrium in the garage.

The smoke ring in meat is caused by four things:

- 1) Low temperature cooking,
- 2) combustion of the wood at high temperatures to form nitrogen dioxide,



- 3) nitrogen dioxide, and
- 4) moisture on the surface of the meat to help move the water soluble nitrogen dioxide into the meat.

When these conditions are met, nitrogen dioxide in wood smoke reacts with the myoglobin in meat to form nitrites and nitrates. These are the same compounds added to hot dogs and other cured meats to preserve them and they also give them their pink color.

When smoke roasting, the moist meat absorbs smoke. Less smoke is absorbed as the cooking continues because the surface of the meat begins to seal and becomes saturated with smoke. For this reason putting a pan of water in a smoker helps create a smoke ring. In fact some smokers, called water smokers, have water pans built in.

Most of the smoke flavoring occurs in the first hour or two of cooking so adding wood to the fire late in the cook doesn't create as much flavor. It also allows moisture to escape. It's better to just leave the door closed.

A faux smoke ring can also develop *without smoke* if you cook low 'n' slow. When meat is cooked fast, the proteins in the muscle and myoglobin denature at the same time and combine to turn brown. When cooked slowly, the muscle proteins finish denaturing before the naturally pink myoglobin denatures and so the meat remains pink. You can occasionally see this phenomenon in braised meat like a beef stew. It may have been cooked for hours in a liquid at low temps, yet the meat will still be slightly pink inside.

On the other hand, some meats cooked low and slow in a smoky environment in an electric smoker will not develop a smoke ring. That is partially because the wood smolders at a low temp in electrics. Experts at cooking in electric smokers will add a charcoal briquet as well as wood chunks to create the correct atmospheric conditions for a smoke ring.

Enough is enough

One of the biggest mistakes we frequently make is using too much smoke. Too much smoke can make your meat bitter or taste like an ash tray. Smoke is like salt. You can always add more but you can't take it out. Do not try to cook with wood. It is too hard to control the temp and the amount of smoke. When you become an expert, you may be able to cook with wood only, but at the outset stick to charcoal, propane, or electricity. I cannot give you a precise amount because each cooker is different and the amount of wood to get the right flavor will depend on the volume of the cooking chamber, the airflow, leaks, how often you peak, the kind of wood you use, and of course, your preferences. You will need to experiment, but a good rule of thumb is start experimenting with about two ounces of wood, regardless of the cut or weight. For dense, thick cuts of meat such as pork butts for pulled pork or beef brisket, you can double or triple the amount of smoke. If the results are not smoky enough, you can add more wood on your next cook.

Smoke cold meat

There is some evidence that meat right out of the fridge absorbs smoke more readily than warm meat, so add your wood when the cooker gets up to the target temp. Try to get all your wood on in the first hour.

Sauce late

Sweet sauces can burn if you add them too early in the process and they can prevent the smoke from penetrating the meat. For the best saucing strategies, [click here](#).

Bottom line

Take your time, dial down the heat, and have the following on hand: a cooker with good heat control, a good thermometer, a comfy chair, a good book, and a great beer.