

# DOES GRILLING CAUSE CANCER?

HOW TO GRILL WITHOUT THE SCARY SIDE EFFECTS

## IS GRILLING HAZARDOUS TO YOUR HEALTH?



The headlines say grilling causes cancer. Are they right? Well, grilling does produce a couple of chemicals that may increase the risk of cancer.

## HETEROCYCLIC AMINES

Heterocyclic amines (HCAs) form when meat is overcooked or charbroiled. HCAs can damage and change DNA.

### FOUR FACTORS INFLUENCE HCA FORMATION:

1. Type of food
2. How it's cooked
3. Temperature
4. How long it's cooked





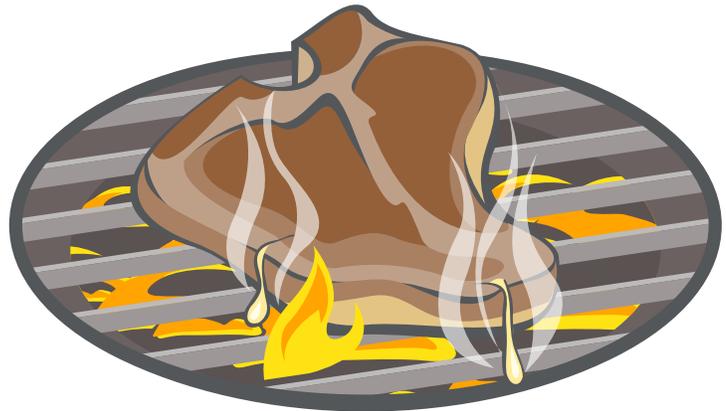
Temperature is the most important of these four. While HCAs begin to form at 212°F (100°C), the truly nasty types start to be made in large quantities at about 572°F (300°C).

## POLYCYCLIC AROMATIC HYDROCARBONS

Polycyclic aromatic hydrocarbons (PAHs) form when meat is charred or blackened, or when fat from the meat drips onto the hot surface of the grill.

### PAH CREATION IS INFLUENCED BY:

1. Temperature of cooking
2. How long food is cooked
3. Type of fuel used in heating
4. Distance from heat source
5. Fat content of the food



The hotter and longer a meat is cooked, the more HCAs and PAHs.

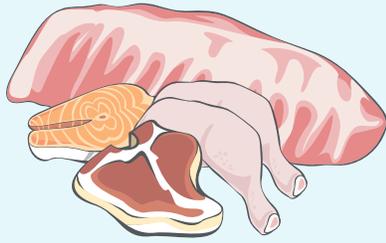
## YOU CAN STILL GRILL!

There are some great ways that can allow you to grill delicious food - without the health risks.

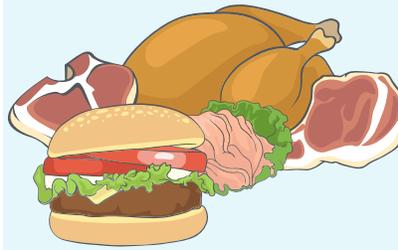
### CHOOSE MEAT WISELY

Highly-processed meats have a much stronger link to cancer than minimally-processed meats.

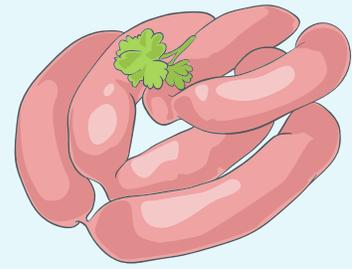




Use whole, minimally-processed cuts of meat such as steaks, chicken thighs, ribs, fresh fish and seafood.



If you like burgers, try making your own with ground beef, lamb, pork, bison, chicken or turkey.



If you like sausages, look for fresh, traditionally made versions.

When you can, choose relatively leaner cuts, as fatter cuts drip more lipids into the grill, causing greater PAH formation.

## USE HERBS AND SPICES



### MINT FAMILY HERBS

decrease HCA formation.



### ONION POWDER

can reduce one of the major types of HCAs (PhIP) by up to **94%**.



### TURMERIC

can decrease HCA formation by up to **40%**.



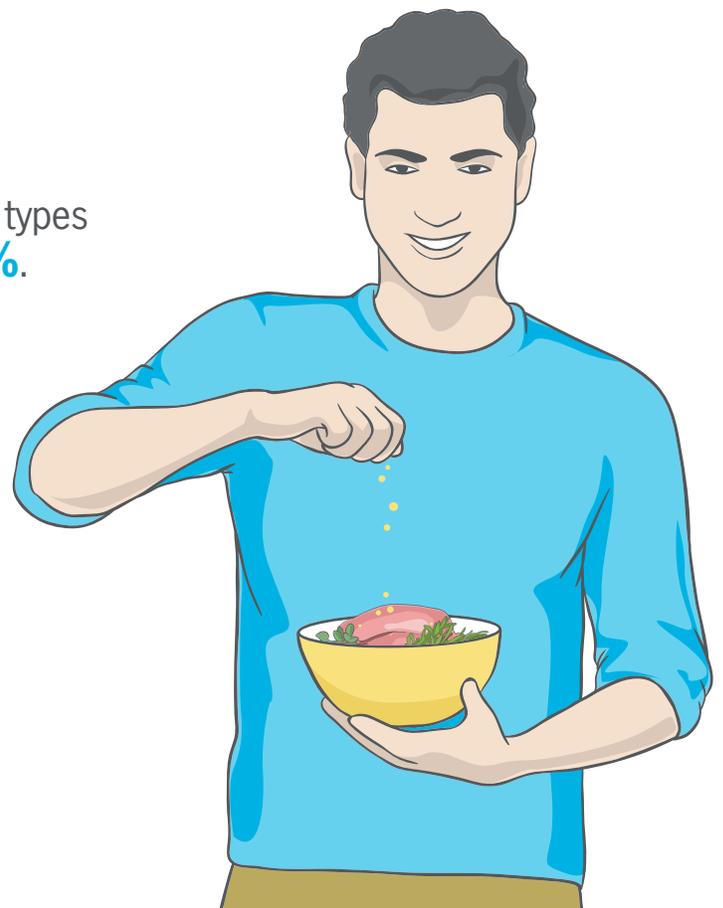
### FRESH GARLIC

can decrease HCA formation by up to **70%**.



### ROSEMARY

can lower HCA formation by up to **90%** in some cases.





## MARINATE YOUR MEAT

Marinades can lower HCA levels by as much as 99%.



### ACID-BASED MARINADES

can dramatically reduce HCA formation.



### BEER MARINADES

marinating in dark beer can decrease PAH levels by **53%**, whereas a light Pilsner marinade can only reduce PAH by **13%**.



## AVOID THE HONEY BBQ SAUCE MARINADE

On the other hand, a sweet BBQ sauce can increase HCA formation 1.9 - 2.9 times. But if you are going to use BBQ sauce, put it on at the end of cooking. That way it's less likely to burn and char.

## INCLUDE LOTS OF THESE FRUITS & VEGGIES

Foods that inhibit the mutagenic activity of HCAs include:

red grapes  
kiwi  
watermelon

blueberries  
apples  
dried plums

spinach  
parsley  
cherries

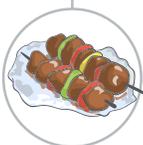


# STRATEGIZE WHILE COOKING

Cut your meat into smaller pieces.



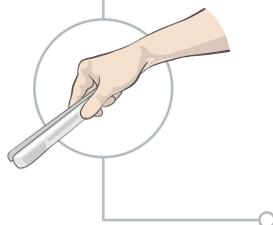
Cover the grill with foil to reduce drips and flare ups.



Cook meat on medium to medium-high heat.



Flip meat frequently.



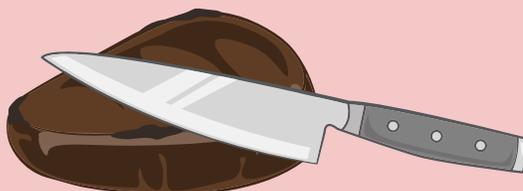
## DON'T OVERCOOK

Go with medium-high temperatures, about 375-450°F.



**MEDIUM-RARE**

**WELL-DONE**



**HCA's and PAH's depend on temperature plus time.**  
Well-done meat contains 3.5 times as many HCA's as medium-rare meat.

**Blackened and charred meat have the highest levels of HCA's and PAH's.**  
So cut blackened bits off when they happen.



For the full article explaining this infographic:  
<http://www.precisionnutrition.com/how-to-grill-healthy-food>

