

## FISH AND SHELLFISH

2-4 SERVINGS PER WEEK (1 serving = 3-4 ounces)



Fish is an animal protein and considered a white meat. However, I choose to give fish a separate chapter due to its unique position in healthy eating. What makes fish so special? Omega-3s. What are the major concerns about fish? Mercury and PCBs.

### HEALTH CONCERNS

First, let's discuss the bad boy in the room, *mercury*. Mercury is a dangerous neurotoxin that can disrupt brain function and is especially dangerous to pregnant women and young children. Children exposed to mercury in the womb can have impaired neurological development.

Mercury poisoning is largely linked to seafood: eating high mercury level fish; and/or too much fish.

Fish get mercury from the water they live in due to pollutants, primarily *coal burning*. All fish contain some amount of mercury. The levels of mercury are highest in larger (predatory) fish because they are consuming smaller fish that *also* have mercury. Therefore, the levels are lowest in small fish.

Moderate consumption of fish with low mercury levels is not likely to result in elevated levels of exposure. However, if you consume high amounts of contaminated fish you can be at risk.

### Mercury Symptoms:

- Nervousness or anxiety

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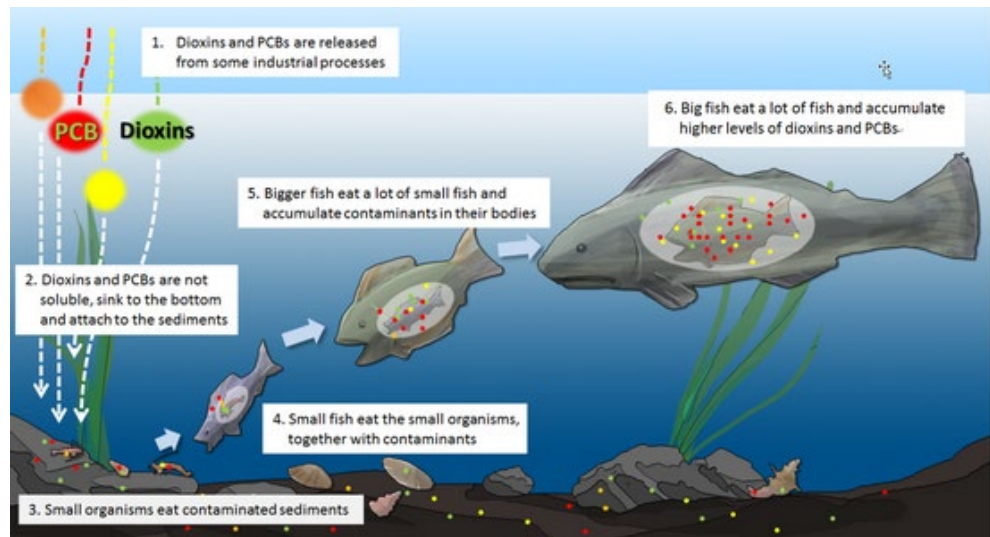
- Irritability or mood changes
- Numbness
- Memory problems
- Depression
- Physical tremors

This list of fish below includes fish you should *not* eat if you are pregnant, nursing, or a child. They may have too much mercury. Adults are *much less* susceptible to mercury and the symptoms (if they occur) disappear after the consumption is stopped. It's the developing nervous system that really matters.

- Barracuda
- Bigeye tuna
- Bluefish
- Grouper
- King mackerel
- Marlin
- Orange roughy
- Shark
- Swordfish
- Tilefish

## PCBs

Polychlorinated biphenyls (PCBs) are highly toxic industrial compounds. Repeated or prolonged exposures to fetuses, babies and children can cause developmental and neurological problems. PCBs accumulate at the bottom of streams, rivers, lakes and coastal areas. The chemicals build up in the fatty tissues of all animals, fish included.

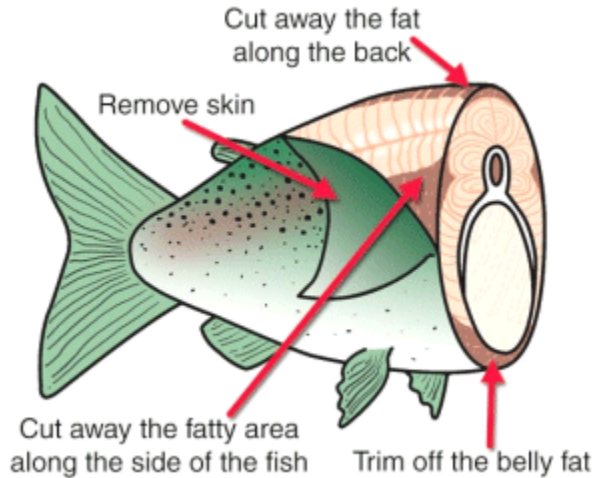


While it's true that PCBs have been banned for many years, increased testing has shown that the problem of PCB-contaminated fish is widespread. But don't eliminate fish from your diet. Unfortunately, PCBs are also in our vegetables, chicken, red meats, eggs, and grain products. It's everywhere. See the separate chapter on PCBs.

PCBs build up in both fish and animal fat. Here are some cooking methods to reduce your exposure:

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- Remove the skin and fat before cooking.
- When cooking, let the fat drain away and avoid or reduce fish drippings.
- Avoid fried fish; frying seals in chemical pollutants. Grilling, broiling or steaming allow the fat to drain away.
- For smoked fish, fillet the fish and remove the skin before it is smoked.



**For an accurate and current reference to healthy and contaminated fish, go to the Environmental Defense Fund (EDF) seafood selector.**

This selector tells you the Eco-rating, mercury, and omega-3s, associated with each fish. In addition, it has the contaminants in each fish and the recommended number of servings per month for men, women and children.

<http://seafood.edf.org/>

### Wild vs Farmed Fish

Wild fish is caught in natural environments such as oceans, rivers and lakes. Farmed fish is dependent upon the feed given to the captive fish. Just like our chickens and cows, the quality of the food depends on the quality of the feed. Most fish feed is based upon ground up fish. So, farm raised fish are being fed mercury and PCBs.

Let's look at a 2000-gram fillet of salmon, wild vs farmed.

	WILD SALMON	FARMED SALMON
<b>CALORIES</b>	281	412
<b>PROTEIN</b>	39 grams	40 grams
<b>FAT</b>	13 grams	27 grams
<b>SATURATED FAT</b>	1.9 grams	6.0 grams
<b>OMEGA-3</b>	3.4 grams	4.2 grams
<b>OMEGA-6</b>	341 mg	1,944 mg

Clearly the difference between wild and farmed is significant. Farmed salmon has much more fat and omega-6 and three times the amount of saturated fat. It also has 46% more calories!

As if the fat and calories are not enough, studies show farmed salmon has much higher concentrations of contaminants than wild salmon. Contaminants such as: polychlorinated biphenyls (PCBs), dioxins and chlorinated pesticides. PCBs are strongly associated with *cancer*.

What about the mercury? Actually, the wild salmon has 3X the amount of mercury as farmed salmon. But, the actual mercury levels of both wild and farmed is relatively low and safe.

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Does this mean we can't eat salmon? Of course not. Salmon is one of the healthiest fish there is, rich in Omega-3. Both the American Heart Association and Harvard Medical School agree that the health benefits far outweigh the health risks.

When you have a choice between farmed and wild, choose wild. If the costs or availability precludes wild as a choice, go farmed and enjoy the omega-3s.

## FATTY FISH

What we really want from our fish is the healthy omega-3 oils. Most lists of fish tell you that you want fatty fish, because fatty fish have more omega-3. That is correct, for the most part. We also want fewer calories consumed for the amount of omega-3 obtained in our diet.

By the way, what is fatty fish? Everyone says it, nobody defines it. The closest definition I could find was any fish over 2% total fat by weight.

The typical list of fatty fish include: salmon, mackerel, herring, eel, lake trout, sardines and albacore tuna.

I will show you a list based upon the amount of good omega-3s available per calorie. Let's be omega-3 *dense* on our diet. While I break the fish into groups based on omega-3 density, some fish should not be widely consumed secondary to mercury or PCB contaminants. As adults, it is mainly the PCBs we are concerned with, not the mercury as much.

Unknown contaminants, 4 servings/month

Elevated contaminants, 3 servings/month

Elevated contaminants, 2 servings/month

Elevated contaminants, 1 servings/month

Elevated contaminant, <1 servings/month

No color means the fish is safe to consume without limitations according to the EDF Seafood Selector. <http://seafood.edf.org/>

### Fish with 10 milligrams or more omega-3 per calorie. Average fat 8.7%

- Anchovy, european
- Herring, atlantic
- Mackerel: atlantic
- Mackerel: Spanish
- Roe
- Salmon: COHO (silver, Alaska); Chinook; Atlantic (wild & farmed)
- Shad

**Nutrients per 3 oz serving:**

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Calories – 137; Protein – 17 grams; Total fat – 7 grams; Saturated fat – 1.7 grams;  
Monounsaturated fat – 2.6 grams; Polyunsaturated fat – 2.2 grams; Omega-3 – 1.7 grams;  
Cholesterol – 77 milligrams

### **Fish with 7 up to 10 milligrams omega-3 per calorie. Average fat 6.1%**

- Herring, pacific
- Mackerel, pacific
- Oyster, pacific
- Sablefish (butterfish)
- Salmon: sockeye; COHO (wild/farmed)
- **Shark**
- Smelt, rainbow
- Stripped bass, farmed
- **Stripped bass, wild**
- **Tuna, bluefin**
- Wolf fish

#### **Nutrients per 3 oz serving:**

Calories – 116; Protein – 16 grams; Total fat – 5 grams; Saturated fat – 1.2 grams;  
Monounsaturated fat – 2.1 grams; Polyunsaturated fat – 1.3 grams; Omega-3 – 1 grams;  
Cholesterol – 46 milligrams

### **Fish with 5 up to 7 milligrams omega-3 per calorie. Average fat 4.5%**

- **Bass**: sea; freshwater.
- **Bluefish**
- Drum, freshwater
- Halibut, with skin, Alaska; Greenland (Turbot)
- Mussel, blue
- Oyster, eastern, farmed
- Salmon: sockeye (red, Alaska); King (chinook, Alaska); chum
- Spot
- Squid
- Sucker, white
- **Swordfish**
- **Tilefish**
- Trout, rainbow: farmed or wild
- **Tuna, packed in water.**

#### **Nutrients per 3 oz serving:**

Calories – 103; Protein – 16 grams; Total fat – 3.8 grams; Saturated fat – 0.8 grams;  
Monounsaturated fat – 1.4 grams; Polyunsaturated fat – 0.9 grams; Omega-3 – 0.6 grams;  
Cholesterol – 53 milligrams

### **Fish with 3 up to 5 milligrams omega-3 per calorie. Average fat 2.6%**

- Carp
- Catfish, channel, wild
- Cisco
- Crab: queen; dungeness; blue
- Flatfish (flounder & sole species)
- Lobster, spiny
- Mackerel, king
- Mullet, striped
- Perch
- Pollack, atlantic
- Pompano, Florida
- Rockfish, pacific
- Salmon, pink (humpback)
- Seatrout
- Sheepshead
- Snapper
- Sturgeon
- Trout, Brook, Yew York State
- Walleye Pike

#### **Nutrients per 3 oz serving:**

Calories – 87; Protein – 16 grams; Total fat – 2.2 grams; Saturated fat – 0.5 grams;  
Monounsaturated fat – 0.7 grams; Polyunsaturated fat – 0.5 grams; Omega-3 – 0.3 grams;  
Cholesterol – 51 milligrams

### **Fish with 2 up to 3 milligrams omega-3 per calorie. Average fat 1.1%**

- Burbot
- Cod: atlantic, pacific
- Crayfish
- Croaker, atlantic
- Grouper
- Halibut: pacific
- Halibut: atlantic
- Lobster, northern
- Octopus
- Snail
- Tuna, skipjack
- Tuna, canned in water
- Walleye Pollack

- Whiting

**Nutrients per 3 oz serving:**

Calories – 73; Protein – 15 grams; Total fat – 0.9 grams; Saturated fat – 0.2 grams;  
Monounsaturated fat – 0.2 grams; Polyunsaturated fat – 0.3 grams; Omega-3 – 0.2 grams;  
Cholesterol – 52 miligrams

**Fish less than 2 miligrams omega-3 per calorie. Average fat 2.3%**

- Abalone
- Catfish, channel, farmed
- Clam
- Cuttlefish
- Dolphin fish
- Eel
- Haddock
- Orange Roughy
- Pike, northern
- Pollock, Alaska
- Scallop
- Shrimp
- Sunfish
- Tilapia
- Tuna, canned in oil
- Tuna, yellowfin
- Whelk

**Nutrients per 3 oz serving:**

Calories – 89; Protein – 16 grams; Total fat – 2.0 grams; Saturated fat – 0.4 grams;  
Monounsaturated fat – 0.8 grams; Polyunsaturated fat – 0.5 grams; Omega-3 – 0.1 grams;  
Cholesterol – 52 miligrams