

**Biology: How much mercury are we eating?**

Compared to chicken, pork, and beef, fish is lower in saturated fats and cholesterol. Many people at risk for heart disease and high blood pressure 'switch to fish' in order to lower fat and cholesterol in their diets. However, many types of fish have high levels of methyl mercury, which is known to affect the nervous system. So, how much fish is safe to eat, and what types of fish should be avoided?

1. Find out how many parts per million (ppm) of methyl mercury are in each type of fish. Use the mean amount listed in chart provided ( <http://www.cfsan.fda.gov/~frf/sea-mehg.html> )
2. Convert ppm to mg/kg, and record in the data table.
  - 1 ppm methyl mercury is the same as 1 milligram (mg) of methyl mercury per 1,000,000 mg of fish, or 1 mg MeHg/ 1 kilogram (kg).
3. Calculate how many mg of MeHg are consumed in 1 serving of fish. The FDA recommends 3 oz (0.085 kilograms) of fish as one serving.

Equation:  $\text{kg of fish in one serving} \times \frac{\text{mg of MeHg}}{1 \text{ kg}} = \text{amount of MeHg consumed in mg}$

Example:  $0.085 \text{ kg} \times \frac{0.730 \text{ mg}}{1 \text{ kg}} = 0.0621 \text{ mg MeHg}$

	mg/ kg MeHg	mg MeHg per serving
King Mackerel	0.73 mg/ kg	0.0621 mg MeHg
Swordfish		
Catfish		
Cod		
Crab		
Orange Roughy		
Oyster		
Salmon (fresh)		
Scallop		
Shrimp		
Squid		
Trout (fresh water)		
Tuna (canned, light)		
Tuna (canned, albacore)		
Halibut		

4. The EPA estimates a minimum lethal dose of mercury to be between 20-60 mg MeHg for a 70 kg (154 lbs) person. Pick any fish above and determine how many servings it would take to reach the lethal dose for methyl mercury. Show your work in the space below.

Example: 1 serving of King Mackerel = 0.0595 mg MeHg  
 $20 \text{ mg MeHg} \times \frac{1 \text{ serving}}{0.0621 \text{ mg MeHg}} =$

5. The EPA estimates that a person can be exposed to 0.1  $\mu\text{g MeHg/kg}$  a day without experiencing any harmful effects. This is called the RfD or reference oral dose. Select fish with high, medium and low mercury content. Use the calculator on the following website to find out the mercury risk in eating 12 ounces (0.34 kg) of that fish a week. <http://gotmercury.org>

Fish Species	$\mu\text{g/ kg MeHg}$	Risk Level

6. What is the difference between Rfd and minimum lethal dose? Which one would you use to explain the risks of mercury in fish to a friend and why?

7. Methyl mercury has a half life of 70 days. This means that after 70 days, only half of the mercury you ate will be gone. Construct a half-life graph that shows how much mercury is in your body after eating 6 ounces (about 1 can, or 0.17 kg) of canned albacore tuna. (Hint: the amount of mercury will go on the Y axis, and the number of days on the X axis). Create your graph on graph paper and attach to this worksheet.

8. Use your half life curve to answer the following question. If a person eats a 6 ounce can of albacore tuna every 5 days, approximately how much MeHg will be in their system at the end of a 30 day month? Assume they had their first can of tuna on day 1 of the month. Show your work.

9. When choosing what fish to eat, methyl mercury content is an important consideration. However, we also need to consider whether or not the fish is coming from a sustainable fishery. Use the Monterey Bay Aquarium's Seafood Search on the Seafood Watch page to find out if fish with low mercury content come from sustainable fisheries. Record the fish, mercury content per serving, and sustainability rating below. (<http://www.mbayaq.org/cr/seafoodwatch.asp>)

Fish	Mercury Content per Serving	Monterey Bay Aquarium Rating