What we can learn from poisons:

During the evolution section, we talked about the "Arms Race" between predators and prey for both offensive and defensive weapons. Nowhere is diversity more striking. But, there are additional lessons to be learned from some of the components of that arms race, particularly the toxins made by various organisms. Toxins exist that affect many functions: peptides that prevent blood clotting made by leaches and some snakes; insecticides made by plants; a protein from castor beans that shuts down your ribosomes. Since we are studying the nervous system, we will focus on various neurotoxins. Understanding how organisms have exploited our nervous system helps us understand our nervous system. Moreover, many of these poisons turn out to have potential therapeutic effects.

A few of my favorite toxins:

1. Tetrodotoxin
2. α-latrotoxin
3. Botulinum toxin
4. Tetanus toxin
5. Chlorotoxin
6. α-bungarotoxin
7. Anatoxin-a
8. Muscarine
9. Saxitoxin
10. Conotoxin α toxin(there are several)
11. For fun, look up "Mandrake" in Wikipedia.

Pick any two from this list. We will not have "presentations" *per se*, just discussions. Also, you should all look up number 11, just for fun (especially if you are a fan of Harry Potter and the Chamber of Secrets).

1. What organism makes this toxin (who is trying to kill you?).
2. Is it a peptide (protein), which means it is encoded in DNA and made by ribosomes *or* is it a small molecule synthesized by enzymes? (note that proteins are generally denatured by heat, but small molecules may survive cooking).
3. If available, what is the LD_{50} of this molecule? (that stands for "Lethal Dose 50," which is the amount needed to kill half the organisms that get that dose).
4. What is the "macro" effect? Does it paralyze its victim? Does it shut down the heart?
5. What is the molecular effect? How does it achieve the macro effect? Does it block a signal pathway? Does it *over* stimulate a pathway (look for the words "antagonist" and "agonist"). Does it act like a neurotransmitter? Or, does it compete for binding of a neurotransmitter to its receptor?
6. Optional: "Fun Fact." Tell me something amusing about this deadly poison.