**What if Anna accidentally consumed picrotoxin?**

After completing the Waking up Anna exploration – i.e., explaining the question “What was the molecular bases for Flumazenil’s action in waking up Anna?” answer the following questions.

Picrotoxin is obtained from the seeds of the shrub *Anamirta cocculus*. It is used as a central nervous system stimulant and an antidote in poisoning by CNS depressants, especially barbiturates (<https://www.drugbank.ca/drugs/DB00466>).

Q1. Picrotoxin acts as a non-competitive antagonist of GABA. Based on your understanding of a competitive antagonist, how do you think a non-competitive antagonist works? Where do you predict that picrotoxin might bind to the GABA-A receptor? (Hint: Look up the different mechanisms for competitive vs. non-competitive antagonists.)

Search the PDB for a structure of a GABA-A receptor in complex with GABA and picrotoxin bound.

Q2. What is the PDB ID?

Visualize the structure in the PDB entry that you identified using iCn3D.

Q3. In the line drawn model of a pentameric GABA-A receptor (as seen from the outside of the cell) and mark where GABA and picrotoxin bind. Remember to label the alpha, beta, and gamma chains of the GABA-A receptor.



Q4. Create a publication quality figure illustrating any two types of non-covalent interactions that hold the picrotoxin in place in the GABA-A receptor complex.

Q5. Based on the structure and interactions of picrotoxin, how is the function of the GABA-A receptor affected?

Q6. Do you think that this molecule can be used to treat Anna’s insomnia? Support your answer with suitable reasons.