**Evolution of Caffeine Biosynthesis Enzymes**

**Purpose**:

Your teacher has chosen a case to engage your interest and introduce you to the following:

1. the process of scientific research and presentation of arguments with evidence
2. scientific literature and authentic biological data resources
3. structure-function relationships in biological macromolecules

**What can you learn from the case?**

Whether you plan to pursue a career in scientific research, or just become an informed citizen there is a lot that you can learn from this case. For example, you can learn

1. How to exchange ideas – Be prepared to listen to the comments of your classmates to learn about their ideas but at the same time present your ideas and support them with as much evidence and persuasion as you can. Keep an open mind, and do not hesitate to incorporate ideas of other students when you find them persuasive.
2. How to ask relevant questions:

* What is the situation? What problem(s) need to be solved?
  + What do you need to know about caffeine, its biosynthetic pathway, and the structure and function of enzymes facilitating the synthesis?
  + What literature or websites would give you valid information about caffeine synthesis enzymes’ structure and function?

1. How to gather relevant data to solve a problem:

* What might you want to know or need to know about this case?
* How would you learn more about the structure of caffeine?
* Where might you go to learn about the structure of caffeine biosynthesis enzymes (e.g., from tea and cocoa) when one is not available from the PDB?
* How would visualizing and understanding the structure and function of the coffee enzymes help you in this case?

1. How to apply your experience from this case to solving other problems
   * What are some key concepts of this cases that are broadly applicable?
   * What are some skills that you can acquire through this case (e.g., molecular visualization)
   * How can participating in this case help you in your future career?