

QUESTION ONE:

Part One. Propose a mechanism that uses the properties of lipids to sense temperature. Be explicit about the way that you would 'tune' the lipids for various temperature ranges, showing structures as required.

Part Two. Compare your mechanism to known temperature-sensing transporters. These can be from any biological clade (although the animal world should provide you with the most fascinating examples). I am especially interested in the mechanism. In other words, you may find that heat activates channels, but how does it activate them?

Hint: I am not interested in a literature review, or essay-style approach. You will find many papers on heat sensing channels, but probably very little on the heat-sensing mechanism. It's the latter I am interested in. For example, are lipids involved? Is there an infrared absorbing pigment? Do scientists actually know? And if not, what do you propose?

QUESTION TWO: Assuming that action potentials would be triggered if the resting potential of excitable cells is depolarized by 30 mV from the normal resting potential of –80 mV, calculate the LD₅₀ (lethal dose, at which 50% of the population would die) for bananas. Assume that potassium clearing is not occurring and for the sake of simplicity, assume you need only consider blood volume.

Ground Rules: I expect that students may (or may not) wish to work with each other on the assignment (depending on personal preference), and may certainly come to me for help. But, please ensure that the work you hand in is in your own words (it's your voice I want to hear).