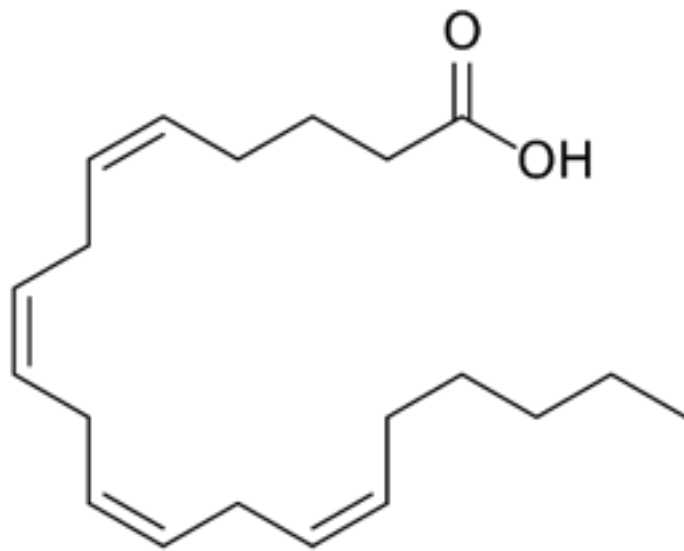


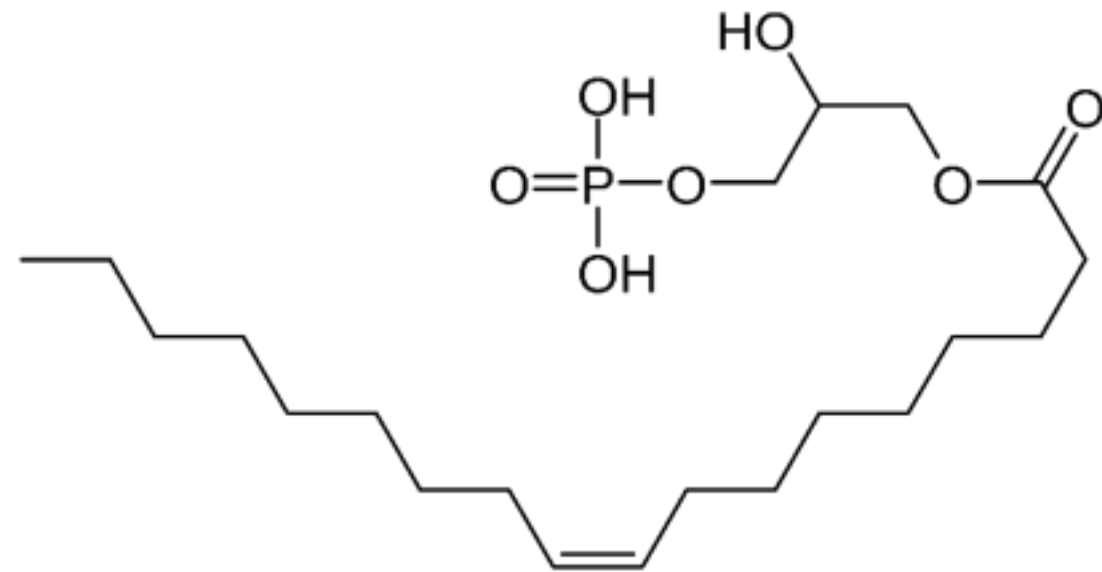
Exercise 1

Animal venoms comprise a complex mixture of components that affect several biological systems. One of the main components of such venoms are secreted enzymes known as secreted phospholipase A₂ (sPLA₂).

The resulting products upon sPLA₂ activity are shown below.



Product 1



Product 2

- Name Product 1 using both the delta and omega systems.
- On the picture of product 2, circle the likely site of cleavage/ action by sPLA₂. Which class of lipid does the substrate belong to?
- sPLA₂ acts by disrupting the membrane of the host. Can you explain this in terms of sPLA₂ impact on membrane bilayer structure?

Exercise 2

Lipid bilayers forming between two water phases have the following important property: they produce bi-dimensional sheets where their edges seal to form liposomes.

- a. What lipid-specific properties account for this behaviour?
- b. What is the consequence of this property on biological membranes?

Exercise 3

A mixture composed by the following lipids is placed on a silica column and eluted with increasingly polar solvents.

The mix is constituted by:

*palmitic acid,
cholesterol-palmitate,
cholesterol,
phosphatidylcholine
and a triglyceride.*

In which order are these lipids eluted from the column (explain the rationale)?

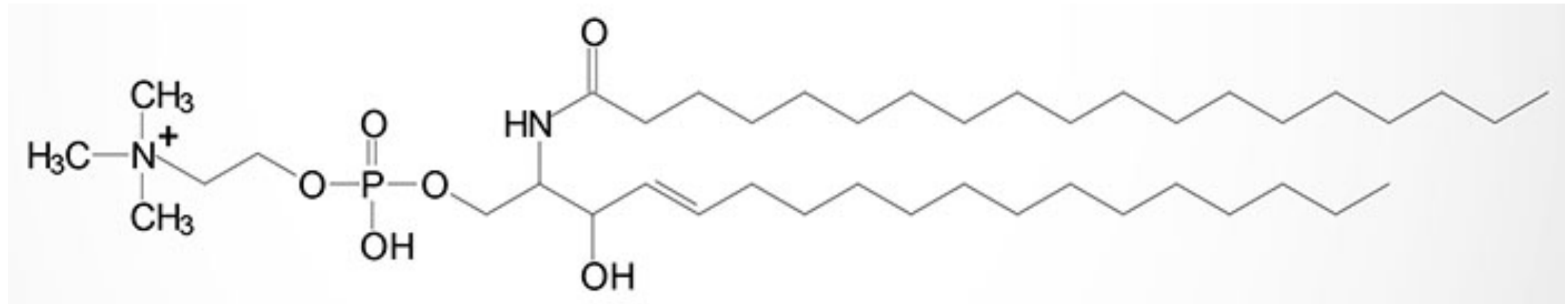
Exercise 4

The melting points of a series of 18-carbon fatty acids are: stearic acid, 69.6 C; oleic acid, 13.4 C; linoleic acid, -5 C; and linolenic acid - 11C.

- a. What structural aspect of these 18-carbon fatty acids can be correlated with the melting point?
- b. List all possible triacylglycerols that can be constructed from glycerol, palmitic acid, and oleic acid. Rank them in order of increasing melting point
- c. Branched-chain fatty acids are found in some bacterial membrane lipids. Would their presence increase or decrease the fluidity of the membrane (that is, give them a lower or higher melting point)? Why?

Exercise 5

Examine the membrane lipid pictured below and answer the following questions.



- Is this lipid classified as a phospholipid or a glycolipid? How can you tell?
- Is this lipid considered a sphingolipid or a glycerophospholipid? How can you tell?
- What fatty acid chains are used in this lipid? Are they saturated or unsaturated? What kind of bond links the fatty acids to the headgroup?

Exercise 6

A common procedure to clean filters from fats is to use products containing sodium hydroxide. Can you explain how these products work (please draw the involved reaction)?