Supramolecular Chemistry-I

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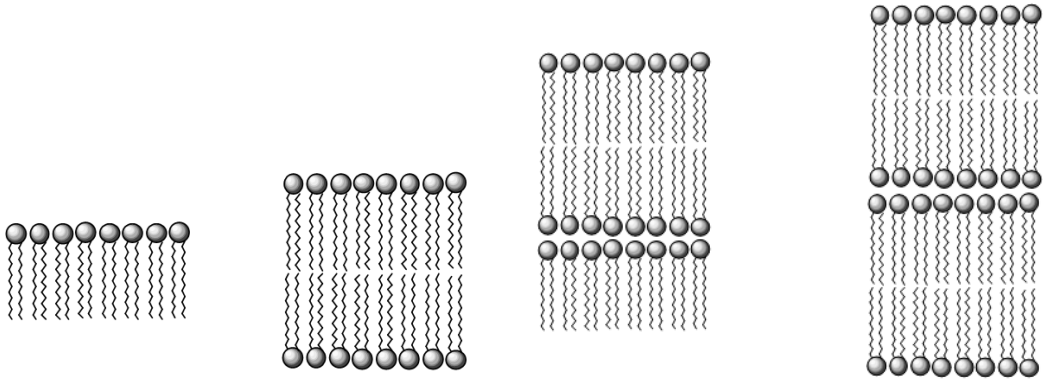
Week - 08

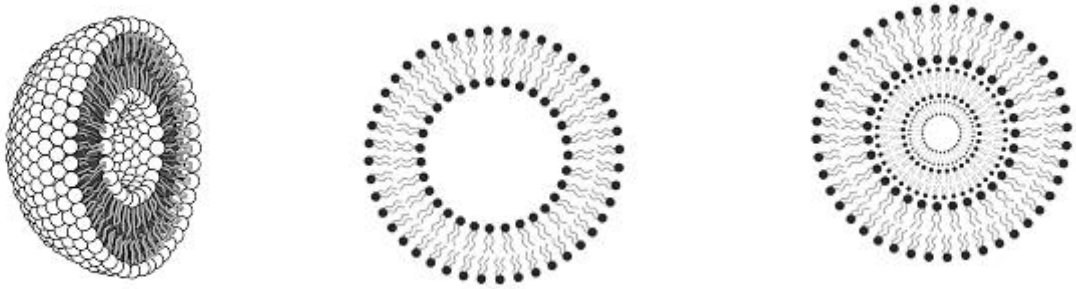
Lecture - 37

In my previous class, I was looking at some of the association of amphiphilic molecules and we said that bilayer structure. I have also shown bilayer structure. The amphiphiles can form monolayers as well:



Monolayer bilayer trilayer multilayer

Then we can have other types of association like tubular structures. Some of these structures are difficult to draw but you should try to get pictures from different books. Let us look at the following structure:



Unilamellar vesicle a section of the unilamellar vesicle a section of a multilamellar vesicle

I explained to you that micelle means like a sphere. Reverse micelle is also sphere and this particular structure, is also a sphere. Except one difference. what is this difference? This structure is formed from a bilayer. Imagine a football, a rubber football and that rubber football is a sphere with some thickness and the thickness is made up of the bilayer. This structure is called a unilamellar vesicle. But if a multilayer folds like a sphere, then we can get what is known as multilamellar vesicle. So, vesicle, micelle and reverse micelle, these are three spherical association of different ways of spherical association of amphiphilic molecules. In a biosystem, vesicles act like transporter like vehicle. You put something in the truck and carry it from one point to the other. Similarly, in biosystems, vesicles will take something inside. So, you will take something inside and then form a vesicle with amphiphilic molecules. This can be destroyed by what? These associations of amphiphiles can be broken by ions to single amphiphiles.

So, how to characterize these vesicular structures? These can be characterize by one technique called transmission electron microscopy. With the help of transmission electron microscopy and we can get what is known as transmission electron micrograph. So, you can get transmission electron micrograph and you can measure the diameter of this vesicular structures formed. As the photograph below illustrates:

How to make vesicles ? We first make a concentrated solution of the amphiphile in a suitable solvent like alcohol and then stir it with lot of water and let it settle. That means say 1 ml of a concentrated methanolic solution of an amphiphile, we can put 100 ml of water stir it and keep it to have vesicles. We shall next talk about the amphiphiles at the air-water interface.