Let me provide a brief introduction to Biochemistry in terms of its relationship to cell structure and function.

Biochemistry refers to the chemistry of living organisms.

The chemistry of living organisms includes a consideration of the structure, properties, synthesis, degradation, interactions and reactions of all of the molecules of an organism.

One approach toward understanding the biochemistry of living organisms begins with the relationship between cell structure and composition.

As shown in Figures 1-13 and 1-4, we consider that organisms such as you and I are composed of various organs, organs are in turn composed of various tissues, each tissue is composed of particular cells, cells are composed of supramolecular assemblies, each assembly is composed of particular macromolecules and lipids.

It is also important to recognize that the distinctive function, as well as the structure of various organs, tissues, cells and organelles of a cell, are dependent on the interaction of particular molecular components.

To illustrate this concept, we may consider the function and composition of various structural components of a cell as shown in Figs. 1-7 and 1-1.

All cells have an outer membrane that separates the cell from its environment.

This membrane is selectively permeable to different molecules by simple diffusion.

The membrane also participates in the active transport of nutrient molecules into the cell and waste molecules out of the cell.

The various functions of membranes are dependent on the interaction of specialized protein and lipid molecules that make up the membrane as shown in Figure 5-3.

The nucleus of eukaryotic cells contains the information required for the synthesis of most of the molecular components of a cell.

This information is largely stored in the sequence of monomer units that make up the polymer chains of nucleic acids found in chromosomes.

The chromosomes are composed of specialized proteins that interact with the nucleic acids and regulate the transcription of information.

The mitochondria, represented by the cigar shaped structures, shown in Figs. 1-7 and 1-2, function as the power plants for cells.

Specialized proteins and membrane lipids serve to oxidize (burn) carbohydrates and fats and convert the free energy of oxidation into a chemical form that can be used for the transport and synthesis of biological molecules.

The endoplasmic reticulum, shown in Figs. 1-7 and 1-1, is a membranous structure composed of particular proteins and lipids that contribute to the synthesis of other biochemical molecules, such as fatty acids.

Ribosomes, shown as small dots associated with parts of the reticulum are composed of specialized proteins and nucleic acids that function together in the biosynthesis of cell proteins.

The sum total of these and other organelles as well as the molecules found in the cytosol of the cell gives rise to the living cell.

Thus we see that the structure and function of all of the components of a cell are dependent on the interaction of particular proteins, nucleic acids, polysaccharides and lipids.

The first three, biochemical molecules are polymers of large size referred to as macromolecules, while lipids are relatively small non-polymeric molecules as shown in Figs. 1-14 and 11.1.

One of the goals of this course will be to discover the manner in which macromolecules , such as proteins, interact with each other and other biochemical molecules to form distinct structural and functional components of a cell.