Introduction

Organic chemistry has been highly disregarded as a discipline of importance for medical and premedical curriculums. At present, however, people are beginning to make the connection between organic chemistry and its importance in the medical field. New curriculums are being designed that unite organic chemistry and biomedical processes. Task forces consisting of chemistry and biology researchers and professors have been formed to design curriculums that incorporate organic chemistry courses to suit the needs of students in medical fields. These task forces are attempting to develop a practical, comprehensive approach to organic chemistry as it applies to medicine.

Organic compounds constitute various substances in the body which are vital for life to be sustained. Proteins, carbohydrates and lipids are organic compounds that contribute to the structure of the human body. Organic compounds also make up enzymes and catalysts that are mandatory for essential biological processes to occur. Also, organic compounds are responsible for governing ion transport channels in the cell which function in carrying information from one cell to another and mediating cell to cell communication. Failure of ion transport may result in failure of important biological processes in the body.

It is evident that organic molecules are essential for the sustenance of all life. Understanding these compounds is crucial in the medical field not only to understand basic biological functions, but also to predict scenarios in the body which may be due to disruption of organic substances, or adverse reactions due to foreign organic substances in the body. Complete medical efficiency will only be achieved when the science of organic chemistry is understood.

The term "Chalcone" was first coined by Kostanecki and Tambor, who did pioneering work in the synthesis of natural coloring compounds. The chemistry of chalcones has generated intensive precise studies all over the world, especially interesting for their biological and industrial applications. Chalcones are colored compounds because of the presence of the chromophore and auxochromes. They are known as benzalacetophenones or benzylidene acetophenones. Chalcones are characterized by their possession of a structure in which two aromatic rings are linked by an aliphatic three carbon chain. The chalcones were known from different names like phenyl styryl ketones, beanzalacetophenone, α-phenyl acrylphenone, γ-oxo-α, γ-diphenyl-α-propylene and α-phenyl-α-benzoethylene.
Chalcone is a unique template that is associated with several biological activities. Naturally-occurring and synthetic chalcone compounds have shown promising biological activity and safety profiles and have the potential to be developed as or more properly serve as lead compounds for the discovery of medicinal importance. Some naturally occurring amino chalcones and antibiotics, own their biological activity due to the presence of enone system.

Chalcones are α,unsaturated ketones which represent the enone system possessing an electron attracting carbonyl group in α conjugated with carbon-carbon double bond. The powerful electron withdrawing group such as carbonyl group, when attached to the α-carbon atom of this conjugated system, deactivates the carbon-carbon double bond towards electrophilic reagents but activate towards electron rich reagents. As a result carbon-carbon double bond of α,unsaturated ketones, acids or esters os susceptible for nucleophilic addition reactions, uncommon for the simple alkenes. This reactivity towards nucleophile is primary due, not to a simple inductive effect but rather to their conjugation with carbon-carbon double bond.

In the α,β-unsaturated carbonyl compounds the carbonyl group and carbon-carbon double bonds are separated by just one carbon-carbon single bond. Thus the carbon oxygen double bond and carbon-carbon single bond are in conjugation. Due to this conjugation such as compounds possess not only the properties of individual groups but also certain characteristic properties of conjugated system. The nucleophilic addition in this system takes place by following mechanism:

The reaction initiated by base, which acts as a catalyst. The nucleophilic in their anion form add to β-carbon atom of conjugated carbon-carbon double bond in such a manner to form most stable intermediate hybrid anion, which then accept a proton from solvent to yield the final product.

In either case in the same equilibrium mixture chiefly the kito product is finally obtained. The tendency of α,β-unsaturated carbonyl compounds to undergo nucleophilic addition is thus not simply to the inductive effect (-I effect of >C=O group) but to the existence of conjugated system their permits formation of resonance stabilized anion. Therefore, the importance of α,β-unsaturated aldehydes, ketones, acids, and nitriles in the synthesis is due to the fact that they provide such a donor or addendum, containing an α-H atom in the system H-C-C=O to a carbon-
carbon double bond that form a part of conjugated system of general formulation C≡C-C=O in an acceptor.

This type of addition is commonly known as Michael addition and takes place under influence of alkaline reagents. The commonly used catalyst in Michael reaction are dry or aqueous sodium or potassium hydroxide, metallic potassium, lithium, sodium or potassium alkoxides, ammonia, sodium amide, dialkyl or trialkyl amines, piperidine, pyridine, benzyl trimethyl ammonium hydroxide, methyl trimethyl ammonium hydroxide and aqueous sodium cyanide. Acidic catalyst like boron trifluoride etherate, zinc chloride, sulphur trioxide, hydrobromic acid and strongly basic resins such as quaternized cross linked polyvinyl pyridine resins have also been used to bring about this reaction.

In Michael condensation competitive side reaction is observed, the catalyst competes with donor for the acceptor molecules. A number of cases have been reported where the donor molecule adds as a fragment and also other abnormal Michael condensation products are formed.

The Michael additions are reversible reactions. Adduct can be splitted back into precursors and by same catalyst that affects condensation. This is known as Michael retrogression. The tendency towards such retrogression can be minimized to a degree by using excess of the reactants.

Chalcones are open chain flavonoids in which two aromatic rings are joined by a three carbon α,β-unsaturated carbonyl system. Chemically these compounds are termed as benzylidene acetophenones, phenyl styryle ketones, benzal acetophenones, β-phenyl acylophenones, α-phenyl-β-benzoylethehene, 1,3 diphenyl prop-2-en-1-ones or simply 1,3-diphenyl propenones. Introduction of aromatic substituent increases the polar character of this enone system and increases their tendency to undergo Michael condensation. Perhaps it is for this reason that a very large number of such reactions have been carried out using substituted chalcones.