

INAUGURATION OF M.Sc ORGANIC CHEMISTRY COURSE: WADIA COLLEGE, PUNE

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All of you are students of chemistry. So let us take a moment and introspect what is chemistry's mission is all about. Chemistry is, in the first instance, an enabling science. Chemistry is not an end in itself, it is a means to accomplish a larger goal. If science is seen as a noble calling, then chemistry has to find a way to make a difference to people lives. How does chemistry impact life? Chemistry is the cornerstone of four pillars on which the well being of our society lives, namely, the chemistry of life, chemistry of materials, chemistry of energy and fuels and chemistry of the environment. As students of chemistry, we need to relate the fundamentals of science that we teach as well as learn, to one or more of these four pillars.

So where does organic chemistry fit in? As someone who was trained as an organic chemist, I can say with confidence and pride that organic chemistry plays a key and critical role in all the four pillars. A sound training in the fundamentals of organic chemistry will unlock many doors for you in the future.

Organic chemistry is predominantly associated with the chemistry of functional group transformations. While this is very important, we cannot afford to ignore certain related fields which are critical if it has to play a pivotal role as an enabling chemistry.

The first and foremost is the interface of chemistry with biology. A new discipline of exploring biology through organic synthesis called chemical genetics or genomics is one of the fastest growing fields of organic chemistry. Without an understanding of modern biology, organic chemists of the future will be illiterate. A foundation course in molecular biology and physical organic chemistry is essential, if organic chemists have to be useful to our society.

The second is the area of homogeneous catalysis including biocatalysis. Increasingly catalysts, not reagents, will be important to organic chemical transformations. The award of Nobel Prize two years ago to Sharpless, Noyori and Knowles is recognition of the key role of catalysis in modern organic

chemistry. Much of the principles of green chemistry (atom economy, energy efficiency, etc.) critically depend upon our ability to creatively use chemical and biocatalysis. The science of catalysis has to rest upon a solid foundation in physical and inorganic chemistry as well as structural chemistry. Organic chemists can ignore physical and inorganic chemistry only at their own peril.

The other area of crucial importance to organic chemists is the area of computational chemistry. An introduction to basic principles of molecular modeling and visualization is essential to all organic chemists. It is said that organic chemists who are ignorant of the basics of computational science will be looked upon in the future as akin to individuals who cannot use a PC. The edifice of computational chemistry rests on the foundations of quantum mechanics. However, today, one can use computational chemistry only with a cursory knowledge of quantum mechanics.

The last is the area of organic solid state chemistry. Molecular self assembly organic supramolecular chemistry as well as the science of macromolecules depend upon our understanding of the organic solid state chemistry. Organic chemists have too long focused on chemistry in homogeneous solutions. Other emerging disciplines such as molecular electronics as well as nano science and technology too are relevant to organic solid state chemistry. Most of the drugs that we consume are organic solids, often crystalline. No wonder that today organic chemists spend a large amount of their time understanding the crystal structures and polymorphism of organic compound. Crystal engineering is today a very sought after discipline by organic chemists.

What does this all mean? Organic chemistry is no longer the conventional and traditional knowledge, that many of my generation learnt in universities. Organic chemistry is now pushing at many frontiers. Only those who can see beyond conventional boundaries will become winners of the future.

All this poses a great challenge to curriculum planners and teachers. While everything cannot be taught, an environment which encourages cross functional learning can and must be fostered.

As you begin your new academic year, I can give only one advice. Engage in life long learning. It will be fun and no matter what happens, it will turn out to be right. May your college and faculty teach you the art of learning.