



## Editorial

# Medicinal chemistry: Actual teaching aesthetics

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### ABSTRACT

Medicinal chemistry has been the backbone of the pharmacy profession. Medicinal chemistry may be defined as chemistry of medicines. This allied branch with pharmacology is being taken as a cumbersome and troublesome subject. This review deals with the mostly incorrect practice and assumptions of Medicinal chemistry as a theoretical subject being taught at the college level for diploma, undergraduate, postgraduate, and doctoral studies.

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## 1. Medicinal Chemistry at Chemical and Biological Interface

As per the Wikipedia “ Medicinal chemistry is discipline at the intersection of chemistry, especially synthetic organic chemistry, and pharmacology and various other biological specialties, where they are involved with design, chemical synthesis and development for market of pharmaceutical agents, or bio-active molecules (drugs).

Compounds used as medicines are most often organic compounds, which are often divided into the, fluticasone, clopidogrel) and "biologics (infiximab, combinant tallic compounds are also useful as drugs (e.g., lithium and platinum-based agents such as lithiumcarbonate and cisplatin as well as gallium).

At the chemical interface, in particular, medicinal chemistry in its most common practice—focusing on small istry and aspects of natural products and computational chemistry in close combination with chemical biology, enzymology development of new therapeutic agents.

Practically speaking, it involves chemical aspects of identification, and then systematic, thorough synthetic alteration of new chemical entitiestic and computational aspects of the study of existing drugs and agents in development in relation to their bioactivities (biological activities and properties), i.e., understanding their structure–activity relationships (SAR). Pharmaceutical chemistry is focused on qualiteye of medicinal products.

At the biological interface, medicinal chemistry combines to form a set of highly interdisciplinary sciences, setting its organic, physical, and computational emphases alongside biological areas such as biochemistry, molecular biology, pharmacognosy and pharmacology, toxicology and veterinary and human medicine; these, with project management, statistics, and pharmaceutical business practices, systematically oversee altering identified formulation, they are safe and efficacious, and therefore suitable for use in treatment of disease.”

Thus, medicinal chemistry has two interfaces *the chemical interface and the biological interface*. Must be given Equivalence to Biochemistry and included in Lifesciences in India.

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To our dismay and to regret, in Indian pharmacy education the subject is being taught with only the chemical interface. Most of the colleges and universities consider medicinal chemistry as Chemical Sciences subject, however the subject is an integral part of Lifesciences just as Biochemistry. Further the biological interface teaching in Medicinal Chemistry at almost all colleges is missing.

Further most of the teachers think it as an application of Organic chemistry and unnecessarily focus on the IUPAC nomenclatures. It is also seen at most of the examination papers at the University Level. It is true that the students feel burden to the subject and does not, thus feels like to take up the structure nor medicinal chemistry.

## 2. Medicinal Chemistry as Applied Science

The interface of medicinal chemistry is applied science of pharmaceutical organic chemistry, molecular and clinical biochemistry, clinical and applied pharmacology, human and veterinary medicine. Most of teachers in India lack this understanding that the subject is applied of all these branches and only focus on the Pharmaceutical Organic chemistry part of the Medicinal chemistry while teaching the subject.

## 3. Human Medicine and Pathophysiology Interface of Medicinal Chemistry

According to the Pharmacy Council India Syllabi and recent notifications from the Council, it has been elaborated that Pharmacist cannot practice Medicine on the other hand Council in past 60 years hasn't taken any efforts to train the pharmacist to manage even the simple ailments. Moreover, the subjects such as Medicinal Chemistry which include Human medicine approach are Organic Chemistry according to Pharmacy Council of India Syllabi from last 60 years. The pathophysiological application of Medicinal Chemistry is missing furthermore, the subject such as medicinal chemistry in which pathophysiology is applied science and only pathophysiology course syllabi of Pharmacy UG, PG and doctoral graduates has been curtailed to only 45hrs i.e. only one semester by the Pharmacy Council of India.

## 4. Basis to Practice Pharmacotherapeutics

Aside from the chemical interface of the Medicinal Chemistry, it also teaches to practice the therapeutics, we find only case studies of clinical relevance being exemplified in some foreign standard textbooks of Medicinal Chemistry and reference books. The Teaching Faculties in Medicinal Chemistry are not even aware about the clinical aspects of the Medicinal Chemistry and are far away from any clinical

case studies in it.

## 5. Pharmacological Approach of Medicinal Chemistry

The biological interface covers the Human and Veterinary medicine which is applied clinical pharmacology application of Medicinal Chemistry. Those practicing medicine and reading the standard textbooks of Pharmacotherapeutics, and Clinical Pharmacology think that the organic chemical structures exemplified in textbooks are biochemistry or plain organic chemistry and not Medicinal Chemistry showing their poor orientation toward their degree obtained from their respective Councils.

## 6. Pharmacology, Medicinal Chemistry and Biochemistry

Medicinal Chemistry should be taught with examples of structural resonance and effects on biological activity which will apply association of Pharmacology, Biochemistry, and actual Medicinal Chemistry in India. At research level the molecular aspects of all these three are directed towards drug discovery and for the betterment and benefit of mankind.

## 7. PG and Doctoral Thesis


The students undergoing thesis in pharmaceutical chemistry must be given a choice of selecting the biological or the chemical interface and accordingly post award of the degree the students should be aware of writing the designatory as master of pharmacy in Medicinal Chemistry. The doctoral degree courses are vaster, spanned for 4-6 years in pharmaceutical sciences and the students should undergoing thesis should not skip any of the outlined interfaces at the course work and should specialize in any one of outlined interfaces.

Last but not the least the teachers of Pharmacy and Chemical Sciences teaching Medicinal Chemistry should really retrospect about the aesthetics of Medicinal Chemistry not merely being as an Organic Chemistry.

## 8. Conflict of Interest

None.

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