

# DIFFERENT METHODS INVOLVED IN MAKING A DRUG

## INTRODUCTION

Any drug that has the ability to produce the desired therapeutic effect is termed as an “ideal drug”. The development of an ideal drug is a huge challenge since they are not only expensive but time consuming and be met with numerous criteria. The process of developing an ideal drug is termed as “rationale drug designing” (Mandal, Moudgil and Mandal, 2009).

## CHARACTERISTICS OF AN IDEAL DRUG

An ideal drug once created should have the desired pharmacological action, with no or minimal side effects. It should be programmed in such a way that it reaches the specific target site at the right time in the desired concentration and should remain in the target site only for a definite required period of time. Moreover, it should be eliminated from the body immediately after its action is complete (Pandit, 2007).

## INDUSTRIAL PROCESSES IN THE PHARMACEUTICAL INDUSTRY

The actual drug production in the pharmaceutical industry can be divided into 3 major steps and they are 1) Research and Development, 2) Conversion of the organic or natural substances into bulk pharmaceutical substances by fermentation, extraction or chemical synthesis and 3) formulation of the final pharmaceutical product.

### 1. Research and Development

The research and development of a new drug has four important phases. The first phase is the pre-clinical research and development in which the promising new drugs are discovered. The second phase is the Clinical Research and development which determines the effectiveness of the drug. This phase in all takes about 6 years. The third phase is the review of the applications of the new drug and the last phase is the post-marketing surveillance which understands the market and the demand for the drug.

### 2. Production of Bulk pharmaceutical substances

The organic chemical compounds are naturally quite complex; these compounds are then modified using various intermediate steps under precise conditions to form drugs that can be used for pharmaceutical purposes. The different processes used to make the naturally occurring organic products into useful pharmaceutical products are;

- 1) Chemical synthesis – example: antibiotics, antihistamines, CNS depressants, etc.,
- 2) Fermentation - example: vitamins, steroids, therapeutic nutrients, etc.,
- 3) Recovery from natural sources – example: Insulin, vaccine, enzymes and digestive aids, etc., and
- 4) A combination of all the processes.

### 3. Formulation of the final pharmaceutical product

The aim of this process is the conversion of the bulk pharmaceutical products produced in the above step from the natural organic compound to a stable usable product. The bulk product is then formulated, compounded and then packaged into desirable and stable forms.

These bulk pharmaceutical products may be converted into either,

- 1) Solid forms such as coated tablets, pellets, capsules, compressed tablets, etc.,
- 2) Liquid solutions such as syrups, ophthalmic, nasal, spirits, collodions, etc.,
- 3) Liquid Dispersions such as suspensions, emulsions and lotions, and
- 4) Semisolid and plastic dispersions such as ointments, pastes, etc.

These products are then packaged according to their specifications and marketed according to demand (EPA, 1997).

## REFERENCES

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