Introduction

For many disease states the ideal dosage regimen is that by which an acceptable therapeutic concentration of drug at the site(s) of action is attained immediately and is then maintained constant for the desired duration of the treatment. Over the past 30 years as the expense and complication involved in marketing new drug entities have increased, with concomitant recognition of the therapeutic advantage of modified release per oral dosage forms, greater attention has been focused on development of sustained, controlled release and delayed release system.

Two types of modified drug delivery systems can be distinguished.

1) devices that decrease the release rate of drug compared to conventional dosage forms, often during prolonged periods of time (e.g., several hours, days, or months), and

2) Systems that increase the release rate compared to conventional dosage forms (e.g., in the case of poorly water-soluble drugs). Both types of systems can be very helpful to improve the therapeutic efficacy of many pharmaco-treatments.

Advantages of Modified drug delivery system:

√ Reduce the frequency of dosing or to increase effectiveness of the drug by localization at the site of action, reducing the dose required, or providing uniform drug delivery.

√ It would be a single dose for the duration of treatment whether it is for days or weeks, as with infection, or for the life time of the patient, as in hypertension or diabetes.

√ It should deliver the active entity directly to the site of action, minimizing or eliminating side effects.

√ This may necessitate delivery to specific receptors or to localization to cells or to specific areas of the body.
The safety margin of high potency drug can be increase and the incidence of both local and systemic adverse side effects can be reduced in sensitive patient. [4]

**Methods for preparing modified release dosage forms**

Following approaches can be used for preparing modified release dosage forms:

1) **Monolithic or matrix systems:**

These systems can be considered as two groups:

* Those with drug particles dispersed in a soluble matrix, with drug becoming available as the matrix dissolves or swells and dissolves (*hydrophilic colloid matrices*);

* Those with drug particles dispersed in an insoluble matrix, with drug becoming available as a solvent enters the matrix and dissolves the particles (*lipid matrices* and *insoluble polymer matrices*).

2) **Membrane-controlled drug delivery system:**

Membrane-controlled delivery systems function as follows. The rate-controlling part of the system is a membrane through which the drug must diffuse. To allow the drug to diffuse out, the membrane has to become permeable, e.g. through hydration by water normally present in the gastrointestinal tract, or by the drug being soluble in a membrane component, such as the plasticizer. Unlike hydrophilic matrix systems, the membrane polymer does not swell on hydration to form a hydrocolloid matrix, and does not erode. A drug reservoir, e.g. a tablet or multiparticulate pellet, is coated with a membrane. The drug should not diffuse in the solid state, although loading of the membrane might be an advantage if an initial release on contact with dissolution medium is desired. Aqueous medium diffusing into the system and forming a continuous phase through the membrane Initiates drug diffusion and release. The essential difference between membranes and a matrix system is that in the former the polymer membrane is only at the surface of the system, whereas in the latter the polymer is throughout the whole system.

3) **Osmotic pump systems:**

In one sense osmotic pump systems are another form of membrane-controlled release drug delivery system and work in the following way. A drug is included in a tablet core which is
water soluble, and which will solubilize (or suspend) the drug in the presence of water. The tablet core is coated with a semipermeable membrane which will allow water to pass through into the core, which then dissolves. As the core dissolves, a hydrostatic pressure builds up and forces (pumps) drug solution (or suspension) through a hole drilled in the coating. The rate at which water is able to pass in through the membrane, and how quickly the drug solution (or suspension) can pass out of the hole, govern the rate of release.