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REVIEW ON: COLON TARGETED DRUG DELIVERY SYSTEM

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ABSTRACT

In recent years the delivery of colonic drugs is important in the delivery of local medicine. Targeted drug delivery to the colon is highly desirable in the local treatment of various intestinal diseases such as ulcerative colitis, Crohn's disease, amebiosis, colon cancer, local treatment of colon pathologies, and systemic delivery of protein and peptide drugs. This article provides an overview of the various colonel-based drug delivery systems such as the critical pH of polymer associated with drug delivery to the colon, time Controlled delivery of drug delivery to Colon microbially triggered systems, prodrug method for colonic drug delivery . targeted drug delivery such as pressure controlled drug-Delivery Systems, Novel Colon Targeted Delivery System (CODESTM), Osmotic Controlled Drug Delivery (ORDS-CT)

***Keywords**: delivery system, colon drug delivery, novel approaches*

1. INTRODUCTION

The purpose of the target drug delivery plan to provide the drug you need to strengthen the body by bringing a the amount of drug treatment in the target area. And necessary for the drug to exist instability, low melting, half life, short life distribution capacity, poor absorption, low specification, and treatment indicator. Identity is possible to provide the highest standard of health care (in prevent drug damage or dysfunction)In the meantime, it can also reduce side effects, toxicity of strong drugs by reducing the dose the oral method is a simple and important method a systematic approach to drug management The results quick Colon is believed to be a good source of peptides as well protein drugs for the following reason " -duodenum and jejunum, eventually releasing the the drug into ileum or colon leading to greater systemic bioavailability. Oral-controlled release formulas small intestines and colon have received a great deal of attention 25 years ago for a variety of reasons including the superiority of the medication and the clinical benefits derived from the unresolved drug release pattern fast or continuous traditional products.The delivery of colonial drugs also gained additional importance not only in the delivery of drugs in a systematic way of treating local diseases, but also in the potential for systematic delivery of therapeutic proteins and peptides delivered by injections. These delivery plans if taken orally, allow the drug to release the drug from the delivery system once the drug has reached the colon. (3,4)

The need for colon-directed drug delivery: It is useful treating the disease at the site of infection and this to increase the local effect of the drug. Chronic colitis, namely ulcerative colitis, and Crohn's disease It is currently treated with glucocorticoids, and other anti-Inflammatory agent Management of glucocorticoids namely dexamethasone and methyl prednisolone by The oral and intravenous tract produce the side of the system. effects including adenosuppression immunosuppression, cushinoid symptoms, and bones resorption. So the preferred delivery of drugs to the colony. it could not only reduce the required dose but also reduce is systemic side effects caused by high doses. Table number. 1: Colonial-directed disease, drugs and sites Need for Colon Target Drug Delivery.

Targeted drug delivery to the colon helps to treat infections on that site, a few side effects of the system and the volume can be reduced. Direct Colon formation is beneficial in the management of proteins, peptide drugs and also prolongs time. drug Colon-oriented drug delivery is suitable for the delivery of white and / or easily accessible drugs chemical and enzymatic degradation of the GI tract, which is strongly affected by hepatic metabolism Serious colon diseases are most effectively treated if the drugs were directed at the colon. For example. Colonctal cancer as colorectal cancer. (5.6)

Table – colon targeted disease, drug and sites

Target	Diseases condition	Drug and active ingredient
Topical actions	Inflammatory bowel disease irritable bowel disease theihna diseases	Hydrocortisone bueno side Prednisolone sulfaselazine balsalazine
Local actions	Pancreatectomy and cystic fibrosis , colors tal cancer	Digestive enzymes supplements 5-flourosil
Systemic actions	To prevent gastric irritation To prevent first pass metabolism of orally Ingested drug .Oral drug of peptides, oral delivery of vaccines.	NSAID Steroid Insulin Typhoid

Advantages:

1) Ideal site for the delivery of active agents to cure the colon diseases (ulcerative colitis, Chrono's diseases, amoebiasis, etc.).
2) Smaller drug quantities should be required for local treatment.
3) Less side effects and drug interactions occurs.
4) Dosage frequency is less so, cost effective.
5) The long retention time of colon, improved bioavailability of poorly absorbed drug molecules (up to 5 days).
6) Reduce gastric irritation caused by many drugs by preventing their absorption in upper GIT (e.g., NSAIDS).
7) Bypass initial first pass metabolism.
8) Extended daytime or night time activity.
9) The drug may bind non-specifically to intestinal contents (dietary residues, intestinal secretions, fecal matter) cause reduce drugs bioavailability.

Disadvantages:

1) Prolonged stay of 3-5 days results in higher plasma levels of the drug and therefore higher bioavailability in general, but especially in the substrates of this enzyme class.
2) A single drug delivery system targeted at one colony has the disadvantages of random drug distribution. formation due to lack of productivity or abnormal abdominal physiology
3) The formation of a particular colon tree is difficult due to many biological barriers
4) Cytochrome (P450) class of digestive enzymes has a low affinity for colonic mucosa. (8,10)

Limitations:

1) Colon provides moderate pH, drug delivery location, reduced enzyme activity, longer transport time and increased response to absorption enhancers

2) A wide range of pH values and different enzymes present throughout the intestinal tract, by which the volume form must go before it reaches the intended destination

3) For better delivery the medicine must be in a dilapidated state before reaching the intestines

4) The liquid content of the colon is much lower and viscous than the upper part of the GI tract.

5) The stability of the tree is also a concern and should be considered during the development of the delivery system. The drug may indirectly bind to food residues, intestinal fluid, mucus, or fecesbissue.

6) The living microflora may also contribute to colon function by the breakdown of the drug metabolic

7) Low temperature and associated density affect the bioavailability of the drug. (7.8)

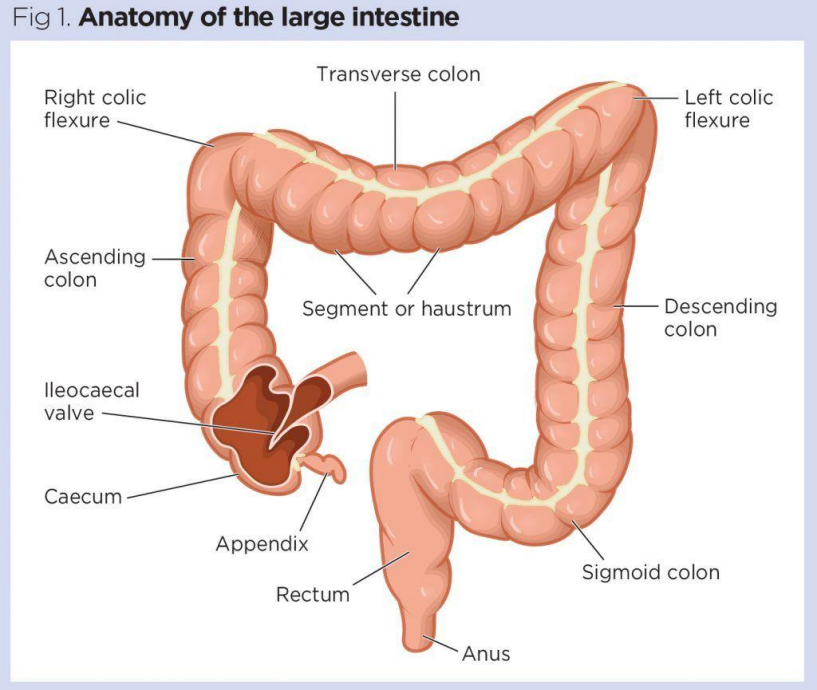

Fig – Anatomy & physiology of colon

2. ANATOMY AND PHYSIOLOGY

The entire colony is about 150 feet long and is divided into 5 major sections. The GI tract is splitin the stomach, small intestine and large intestine. The large intestine extends from the ileocecal junction to the anus once divided into 3 main sections. (Figure - 1) They are the colon, rectum, and rectum. Perinatal folders are called mesentery supported by the rise and fall of the colony. The right colon contains the cecum, which rises colon and hepatic flexure. The left colon contains the descending colon, splenic flexure and sigmoid. The rectum is the last anatomic part before the anus .C colon tissue contains villi, lymph, muscles, nerves and vessels. The absorption capacity is very high, each fluid up to 2000ml enters the colony with the ileocecal valve from which it emits. Ninety percent of the fluid is absorbed. The adult column is a line with at least 8 types of epithelial cells, i.e. columnar or a cells, cryptorcyte cells, open cells, microfolds or M cells, undetectable crypt cells, multivesicular or caveolated cells, goblet cells and a variety of endocrine cells. (3,5,7)

Factors affecting the Colon Drug Delivery:

Factors which influence colon drug delivery are mainly divided into 2 types;

Physiological factors

Pharmaceutical factors

3. A FACTOR TO CONSIDER DURING THE CONSTRUCTION OF COLUMN DRUG DELIVERY SYSTEM

Anatomy and physiology of the colon: The GI tract is divided into abdomen, small intestines and large intestines. Large intestine from ileocaecal intersection to the anus is divided into three main parts. These are colon, rectum and anal canal. The colon forms the lower part of the extended GIT from ileo caecal junction anus. Everything The colony is about 5 feet long made up of four layers; serosa, muscles extrena, submucosa and mucosa.

PH levels in GIT: different pH levels parts of the GI tract are useful in time formulation of colon-directed pills.

Stomach pH is 1-3

The pH of the small intestine is 5 - 7.5

The pH of the large intestine is 6.8 - 7.8

The pH of the rectum is 7.8 - 8

Departure time: Drug delivery time alone of the most important factor to consider the intended formation of the colon of time. Travel The GI timeline given in the following useful table to determine the settlement of the tree in the colon.

Body Move Time

Stomach <1 (fasting), 1> (fed)

Small intestines 3-4

Large intestines 20-30

Conditions for Choosing a Drug for CDDS: CDDS Selection People are the best drugs to show improper absorption of stomach or intestines including peptides. Drugs used to treat diarrhea of IBD ulcerative colitis, as well as colon cancer are ideal candidates for local colon delivery. The CDDS drug selection method is summarized in Table 1. The drug carrier is another factor influencing CDDS. The choice of carrier of certain drugs depends on the physiochemical nature of the Factors such as the chemical nature, stability and partition coefficient of the drug and the type of suction enhancer selected influence the carrier's choice.In addition, the choice of the carrier of the drug depends active molecule groups of drugs. Because for example, aniline or nitro groups in a drug may be used to link it to another benzene group through their obligation. Carriers, which contain additives as polymers (can be used as matrices and hydro gels or coating agents) may influence the release structures and efficiency of systems. and the disease to be used for the system.

4. APPROACHES USED FOR CDDS

Pro drug method of drug delivery to the colon: Prodrug is a breakthrough of a pharmacological action of a parent molecule that needs enzymatic Mutations in the biological field for release A drug that works in the target area. This method includes The interconnected relationship between a drug and its carrier in In such a way that in the oral administration of the episode Remains firm in the stomach and small intestines, too After reaching the colon, enzymatic cleavage Rejuvenate the drug.

Azo-Polymeric Prodrugs: New methods aimed at On the use of polymers as drug delivery carriers In the colony. Both synthetic and natural Existing polymers are used for this purpose. Subsynthetic polymers used for construction A polymeric prodrug with azo communication between Polymer and drug moiety. These have been tested Of CDDS. Various azo polymers are also available Tested as a cover material over drug bullets. These It has been found that he too can be easily infected by cleavage With azoreducatase in the large intestine. Dress for Peptide tablets with polymers attached to them The azoaromatic group has been found to protect the drug From digestion of food in the stomach and small intestines. KuColon, the bindings of azo are reduced . And drug is released.

Polysaccharide Based Delivery Systems: Use of The naturally occurring polysaccharides attract the attention of the colon-targeting drugs from of monosaccharides are found internally Bulk, wide availability is not expensive either They are available in the form of a variety of buildings Properties. They can be easily replaced by chemicals, Biochemically, and very stable, safe, non-toxic, Hydrophilic and gel build up and moreover, there are Biodegradable. This includes what happens naturally Polysaccharides found in plants (guar gum, Inulin), animal (chitosan, chondrotin sulphate), algal (alginates) or microbial (dextran) origin. Polysaccrides can be separated by colonic Microflora in simple saccharides.

5. NEW DEVELOPE APPROACHES OF CDDS

Pressure Controlled Drug Delivery: - a result of peristalsis, higher pressures are present meets the colon rather than in the small intestine. Takaya et al. develop a pressure-controlled colony-delivery pills prepared using ethylcellulose, which it does not melt in water. In such programs, drug release occurs after the dispersal of water-polymer capsule insoluble due to pressure in colon lumen. Size of ethylcellulose The membrane is the most

important part of the body disintegration of the composition. The program also appears to depend on capsule size and density. Due to the re-absorption of water from the colon, the viscosity of the luminal content is higher in the colon than in the small intestine. So it's over that drug eradication in the colon could bring about a problem regarding colon delivery of oral drugs programs. Ethylcellulose single pressure-controlled tablets units drug is liquid. Sleep three times five hours in relation to drug absorption was noted when the capsules are controlled by pressure.

Evaluation test -

There are various in-vitro methods used to test different corporate systems so that they can deliver Drugs that go directly to the colon.

Invitro dissolution test -

The ability of coats or carriers to remain firm in the abdomen and small intestines is usually tested by running. Drug release studies at 0.1NHCl 2 hours. The usual method that involves dispersing in various baths is helpful To test the ability of enteric coating to prevent drug release in the stomach and intestines. Dispersion Colonial-related tests for drug delivery can be performed using the usual basket method. Selected media, for example, pH 1.2- stimulate gastric fluid, 6.8-jejunal region, 7.2-ileal segment.

Invivo Test Tests -

Guineapig, dogs, pigs and mice are often used to test the delivery of the drug in the gut as it does. anatomical and physical similarities. The intestines of the human fetus are transported to the subcutaneous tulle at the back naked thyme mice, growing within 4 weeks, mature and able to develop mucosal immune.a program from the host. to the people.

Clinical evaluation test -

Colonoscopy and intubation can be used to monitor drug absorption in the colon. For now gamma scintigraphy and high frequency capsules are the most popular methods used to diagnose colon medicine delivery plans.

Gamma Scintigraphy: Using this process, the delivery time of the volume form via GIT can be measured and monitored. pharmacokinetic studies by receiving gamma scintigraphy help identify drug absorption sites. Gamma the rays from the subject are combined and received by the crystal. Power is converted into light scintillation and magnification to give digitalized results. This process is infrequent and does not penetrate deep radiation patients can be used effectively. Abdominal digestion of dosage forms and food flow can also be measured. Visualizing the drug delivery process is possible in this way.

6. CONCLUSION

Delivery of the drug to a diseased colon has benefits in reducing the side effects of the system, reducing the dose of the drug, Drug administration only if necessary and keeping the drug in its stable state as close as possible Target area. Better colonic delivery can be achieved by protecting the drug from absorption and / or localization GIT above and then abruptly released into the proximal colon, which is the basis for targeted delivery. All methods provide treatment for local colon-related diseases or systemic absorption Of poorly absorbed drugs .The colon is rich in microflora which can be used to target drug release in the colon.

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