A APPRAISAL OBJECT ON TRANSDERMAL COVERING BY BY ACCEPTED POLYMER AND NIAOULI OIL THEN ITS DEVISING PARTS AS A INFUSION IMPROVE

1Name of 1st Dr. Vikram Panchal
[1]Designation of 1st Assistant Professor
[1]Name of Department of 1st Faculty of Science
[1]Name of organization of 1st Gokul Global University, Sidhpur, Patan, Gujarat – India

ABSTRACT

Transdermal, rectal, intravaginal, ocular etc. Among all of them, oral route is most common and popular but this route of administration have some drawback like first pass metabolism, drug degradation in gastrointestinal tract due to pH, enzyme etc. To overcome these drawback, a novel drug delivery system (controlled drug delivery system)was developed in which a polymer(natural or synthetic)combined with a drug in such a way that drug.

Keywords : Skin Penetration, Bioavailability, First Pass Metabolism

INTRODUCTION

Transdermal drug delivery system:

Any drug delivery system aim is to provide a therapeutic amount of drug to the proper site in the body and then maintain desired drug concentration. Drugs are administered by various routes such as oral, parental, nasal, Transdermal, rectal, intravaginal, ocular etc. Among all of them, oral route is most common and popular but this route of administration have some drawback like first pass metabolism, drug degradation in gastrointestinal tract due to pH, enzyme etc. To overcome these drawback, a novel drug delivery system (controlled drug delivery system)was developed in which a polymer(natural or synthetic)combined with a drug in such a way that drug.

The discovery of Transdermal drug delivery system (TDDS) is a breakthrough in the field of controlled drug delivery system. It becomes a great field of interest. TDDS are self-contained, discrete dosage forms which when applied to the intact skin; deliver the drug, through the skin at control rate to the systemic circulation.

The success of this approach is evidenced by the fact that there are currently more than 35 TDD products approved in the USA for the treatment of conditions including hypertension, angina, female menopause, severe pain states, nicotine dependence, male hypogonadism, local pain control and more recently, contraception and urinary incontinence .9

Advantages :-

The ease of usage makes it possible for patients to self-administer these systems.

Anatomy of Skin:-

Skin is the largest organ in the human body and its easy accessibility makes it an attractive port of entry for drug administration that dates back to the first medical records of man. The formulations that are applied to the skin can be divided into transdermal (for systemic effects) and topical (for local effects in the skin).

Clinical benefits of transdermal drug delivery over conventional routes of drug administration include the following.

1- Sustained drug delivery over long periods (advantageous in long-term drug therapy and for patients that forget to take their drugs regularly, easy-to-check whether the drug has been taken)

2- lower fluctuations in plasma levels (important for drugs with narrow therapeutic windows, may decrease the incidence of side effects or ineffective dosing)

3- Avoidance of metabolism and interactions in the intestine and liver (advantageous for drugs with high first-pass effect, drugs that cause nausea, interact with food and other drugs, or get inactivated in the gastrointestinal tract)

4- Generally good patient compliance (no needle phobia and no risk of complication from accidental needle sticks, no need to swallow pills, less frequent administration)

5- Ease of therapy termination (although removing the patch does not remove the drug absorbed in the upper skin layers but the concentration gradient is largely decreased).

Structure of skin- Skin While scientists aiming at transdermal drug delivery may view the skin as an obstacle to their efforts, others studying the skin homeostasis in health and disease admire the multiple skin barriers, sensory properties, and self-repairing ability. This primarily protective role of the skin must be kept in mind when designing a transdermal formulation: in an attempt to deliver a drug, we should not cause irreversible. For example, with paracetamol, a simple estimation using the required plasma concentration, clearance, and human skin flux suggests that a 6 m2 patch would be required.

The structure of human skin (fig.) can be categorized into four main layers:

¬ The epidermis ¬ The viable epidermis ¬ A non-viable epidermis (Stratum corneum) ¬ The overlying dermis ¬ The innermost subcutaneous fat layer (Hypodermis)

Dermis To reach cutaneous blood vessels and, subsequently, systemic circulation, a drug must get past the upper skin layer, epidermis, into the dermis. The dermis is a hydrophilic layer that does not markedly block the transport of most substances (though it can be a significant barrier for highly lipophilic compounds). Blood vessels in the dermis reach to its interface with the epidermis and remove substances that traversed the epidermal layers, maintaining the concentration gradient between the skin surface and dermis that drives the permeation. Appendages, such as hair follicles, sebaceous glands, and sweat glands, also originate in the dermis and may provide a ‘shunt’ pathway for some permeants.

Epidermis The epidermis is composed of (from the inside to the outside) stratum basale, spinosum, granulosum (also collectively called the viable epidermis), and the stratum corneum. The cells, which are called keratinocytes, in the basal layer continuously divide and move to the surface. During this process, which is called keratinization, keratinocytes produce precursors of barrier components, such as keratin, filaggrin, and lipids that will eventually ‘seal’ the skin surface. The end product of this process, the stratum corneum, is the skin permeability barrier to most substances.

Stratum corneum The stratum corneum consists of flattened anucleate cells, corneocytes, embedded in a lipid matrix. Corneocytes are filled with keratin bundles and other proteins such as filaggrin, and their cell membrane is replaced by a highly cross-linked protein layer, termed corneocyte (cornified) envelope. The corneocyte envelope is further decorated with a covalently attached monolayer of ultralong lipids, called corneocyte lipid envelope. This lipid monolayer likely acts as a scaffold for the orientation of the extracellular lipid matrix and prevents a permeable boundary between the hydrophilic cells and hydrophobic extracellular domains.

This layer of the skin is the most impermeable, forming a laminate of compressed keratin-filled corneocytes attached in a lipophilic matrix. The lipids of this matrix are distinguishing in many respects: • From the skin

surface to the base of the SC, they provide the only continuous phase • Among the biomembranes, the absence of phospholipid is particular and is a composition (ceramides, free fatty acids, and cholesterol) that is unique • The SC lipids exist as multilamellar sheets even though it is having a deficit of polar bilayer forming lipids • The essentially saturated, long-chain hydrocarbon tail aids a highly ordered, interlock configuration. However, the resistivity of the membrane cannot be entirely explained by the unusual lipid matrix, and the architecture of the SC altogether has been proposed to play a role in the barrier property of the membrane. The corneocyte resembling a brick and mortar assembly is suggested to impart the membrane-impermeable to water concerning other biomembranes. And by the visualization studies localizing several permeants, in the intercellular channels by kinetic analysis of the in vivo skin penetration rates of model compounds and by evidence from thermotropic biophysical studies of lipid domains the transport role of this pathway gets furthermore support.

DRUG AND POLYMERS PROFILE

Drug-Isradipine Source: Synthetic

Therapeutic Category: Calcium Channel Blocker Chemical Name: 3-methyl 5-propan-2-yl 4-(2, 1, 3-benzoxadiazol-4-yl)-2,6-dimethyl-1,4-dihydropyridine-3,5- dicarboxylate

Chemical Formula: C19H21N3O45 Physical and Chemical Properties: Appearance: Yellow fine crystal powder. M.W: 331.387 g/mol Purity: More than 99 %.

Solubility: Freely soluble in methanol and ethanol. Taste: Bitter. Polymers- Eudragit L100 Synonym: Methyl Acrylates Formula: C8H12O4 M.W:172.18 g/mol Boiling point: 161 °C

Description: increases solubility of poorly soluble drugs in amorphous solid dispersions; sustained release matrix former for weak basic drugs with high solubility in the stomach and decreasing solubility at higher pH

Solubility: Soluble at pH above 7.0. Storage: Any container 8-25°C. Melting Point: 15 °C.

MATERIALS AND METHODS

1 Isradipine A gift sample from Akums Pvt. Ltd 2 Niaouli oil Extraction Done in Campus 3 EUDRAGIT L100 Sarvodaya Enclave New Delhi 4 Propylene glycol Sigma Aldrich 5 Xanthum Gum HImedia 6 Almond Gum Sigma Aldrich 7 DSMO Sigma Aldrich

Evaluation of Transdermal Patch:-

These studies are predictive of transdermal dosage forms and can be classified into different types including physicochemical evaluation, in-vitro evaluation, and in-vivo evaluation. After the successful evaluation of physicochemical and in-vitro studies, in-vivo evaluations may be conducted.

Physicochemical Evaluation

Drug content determination: It can be determined by completely dissolving a small area (1 cm 2) of polymeric film in suitable solvent of definite volume.

Content uniformity test: The test is applied as the gold standard to determine chemical the content of active constituent for each unit dose.

.% Moisture Uptake:- The patches were weighed accurately and placed in desiccators containing aluminium chloride.

I- Determination of Surface pH:-The patches were allowed to swell by keeping them in contact with 5ml of distilled water for 2hr at room temperature and pH was noted down by bringing the electrode in contact with

the surface of the patches, allowing it to equilibrate for 1 min. J- Tensile Strength and % Elongation: Tensile strength of the patches was determined with Universal strength Testing Machine. It consisted of two load cell grips. The patches of size (2×1cm2) were fixed between these cell grips and force was gradually applied till the patches broke.

CONCLUSION –

A wide variety of natural biodegradable polymers have been investigated and used for drug targeting or prolonged or controlled drug release. It consisted of two load cell grips. The patches of size (2×1cm2) were fixed between these cell grips and force was gradually applied till the patches broke.

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