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An Overview Of Characterizations And Application Of Proniosomal Gel

[1]Mr.Aishwary Nitin Chaudhari , [2]Miss. Shwata Gajanan Chore , [3]Miss. Shital S. Rokade,

[4]Dr. Avinash S. Jiddewar

[1]Student, [2]Student, [3]Asistant professor , [4]Principal
[1]Department of pharmacy,
[1]N.S.P.M College of Pharmacy , Darwha , dist - Yavatmal

ABSTRACT: Traditional drug delivery systems are stable vesicle systems in nanotechnology that overcomethe disadvantages associated with other vesicle systems. A soluble protocyclic drug carrier coated with nonionic surfactants forms vesicles upon hydration. The system is covered, weak and effective drugs are released with increased bioavailability and reduced side effects. The aim of the studywas to develop and evaluate a transdermal gel formulation as a vesicular drug delivery system to increase the stability of the formulation and delivery of the HIV antiviral drugritonavir. Initial studies focused on formulation parameters influencing formulation performanceusing nonionicsurfactants, followed byevaluation parameters forformulation optimization. In addition,they offer an easy way to produce a variety of hydrophilic and hydrophobic drugs. They can use different technologies to deliver the drug to the desired site of action, thereby controlling its release and reducing side effects.

Keywords:Proniosomes; Niosomal;Factorialdesigns;Relationship;TDS

2.INTRODUCTION: In the dry state, proniosomes are surfactant-based water-soluble carriers. From a technical perspective, liposomes are an attractive drug carrier because they have high drug stability and do not suffer from many of the problems of liposomes, such as high cost and complex purification of phospholipids [1-5]. It has attracted considerable attention from researchers since the early 1980s due to its potential use as a drug carrier and transporter. These regimens offer many advantages in avoidingcomplicationscomparedwithtraditionaldrugdeliverymethods.The activityof liposomes depends on lipid composition, surface concentration, size and preparation method. Solving liposome-related issues, onReview Article Volume 1 Issue 3 Article ID: 0017 International Journal of Medicine, Pharmaceuticals and Biological Sciences SN: xxxx-xxxx Received: August 26, 2021/December 23 Revision 20: December 20 December 20 December 20:December 20. 2021 Page 2 of 13 Other methods have been used, namely coating the liposome surface with insoluble, biocompatible hydrophilic polymers such as polyethylene glycol. Figure:Structureofproniosomal vesicles

2.1Characterizationofproniosomalvesicles: Proniosomalvesiclesare testedforthefollowingcharacterizations

2.2Vesiclemorphology: Thesizeofprecursorvesiclescanbemeasurednon-invasivelybydynamiclight scattering.

2.3Shape and surface: Morphology Surface morphology is examined by scanning electron microscopy, optical microscopy and transmission electron microscopy in terms of roundness, smoothness and aggregation formation.

2.4Scanningelectronmicroscopy: Theproniosomesuspensionwascoatedonacarbondoubletapeofanaluminumtube,the vesicles were additionally coated with gold/palladium, and placed in the vacuum chamber of ascanning electron microscope.

2.5Opticalmicroscopy: Preparation of the precursor involves hydrating it with phosphate buffer at pH 7.4, placing the vesicles obtained from the precursor on a glass slide, and countingthe vesicles under a microscope using a hemocytometer, and conducting morphological observations after correctness. dilute. Micrographs of proniosomes were also obtained from the microscope using adigital monocular camera [7]

3.METHODSFORPREPARINGPRONIOSOMES: Proniosomal formulations can be prepared using the slurrymethod. Slow spraymethod. Enchanted phase separation method. Slurry method: Proniosomes can be prepared from animal solutions of surfactant and cholesterol in suitable solvents. The amount of solution of surfactant and cholesterol per gram

of vehicle and drug must be dissolved in the solvent in a 100 ml round bottom flask containing the vehicle (maltodextrin). The flask should be connected to a spin-flash evaporator to evaporate the solvent at a speed of 50-60 rpm at a temperature of 45 ± 20°C and a minimum pressure of 600 mm Hg until the contents are dry. of the container, it will dry. free water. - The results flow. . Slow spray method: A 100 ml round bottom flask containing the correct amount of carrier can be connected to an electronic evaporator. A mixture of surfactant and cholesterol must be prepared and introduced into the bottom groove of the evaporation crackby serially spraying aliquots onto the support surface. The evaporator should be dehumidified and the spinner can be spun in a vacuum water bath at 65-70°C for 15 – 20 minutes. The separation method of the green part: Weigh accurately the amount of surfactant, carrier (lecithin),cholesterol and drug and place it in a clean, dry, wide-mouthed glass bottle (5ml), solvent is added. The inactive form of liposomes, called proniosomes, must be hydrated to convert to the active form.Transdermaldrugdeliverymethodsuseavarietyofskinabsorption strategies.Othertypes, such as proniosome and niosomes, use surfactants to increase penetration into the skin. It is thought that most drug molecules are transported through intercellular channels. It increases the permeabilityandpermeabilityoftheSC,whichincreasesthepenetrationofthedrugintotheSC, Page6 and the reverse organization of the thick intercellular lipid sheet matrix is disrupted. When proniosomes contact the skin, they hydrate the skin and create a thermodynamic gradient at the interface that increases the diffusion pressure for drug penetration into the SC [17-20]. Proniosomeactivityinvolvesbothskinandsystemicabsorption,whichmayoccurintradermally, intracellularly, or transdermally (Figure 1). Based on the physical properties, drugs recommended for transdermal delivery should have a molecular weight of less than 600 Da, excellent oil solubility, good partition coefficient, and latent heat. of fusion, with a p value of1-3. If the p-value of the particle is greater than 3, the hydrogen of the particle will trap the particle in the lipid matrix.

4.Actionof Proniosomes: Proniosomes show their action after they are converted to niosomes on hydration. The hydration may occur either by the skin or bythe addition of aqueous solvents. Proniosomes can entrap both hydrophilic as well as lipophilic drugs. Fig:Pronisomeconversiontoniosome

5. EVALUATION: Scanning electron microscope: Attach the proniosome powder to a double-sided carbon tape, placeit on an aluminum frame, and removetheexcess powder.Onedropofliposomedispersion wasdiluted10timeswithdistilledwater.Removetheresidualdispersion bytakingadroponthe corner of the filter paper. After washing the surface twice (water is removed for 3-5 seconds), add a drop of uranyl acetate 2% aqueous solution for 1 second. Remove the remaining solution by piping water on the tip of the filter paper, and dry the sample in open air. Angle of Repose: The angle of repose of the dry proniosome powder was measured by the inversion method. The powder is poured into the funnel to form a cone on the surface, and the angle of repose is calculated by measuring the height and diameter of the base of the cone. The particle size distribution of the liposomes was calculated individually. Absorption capacity: Separate the free drug from the drug encapsulated in the vesicles by centrifugation. When a 1 ml aliquot of vesicles was centrifuged at 18,000 x g, a solid floating fraction containing vesicles appeared at the top of the tube;the non-liposome solvent fraction remained at the bottom. Drugrelease from proniosomes: In vitro release determined using diffusion tubes. Put enough noise in the exhaust pipe. Place the reduction tube in a beaker containing 370°C water. The drug obtained from the sample is evaluated by appropriate analytical methods.

6.ADVANTAGESOFPRONIOSOMALGEL: Liposomes and niosomes are well-known drug/cosmetic delivery systems. However, thesedelivery systems have been reported to have many drawbacks in terms of preparation, storage, sterilization, etc. Below are the disadvantages of liposomes and niosomes that can be overcomeby proniosomes.

1.Liposomesandniosomesarewater-dispersedsystems,anddeteriorationduetohydrolysisandoxidation is a problem.
2.Liposomesandniosomesrequirespecialstorageandhandling.
3. Sedimentation,aggregationorfusionon storage isusuallyseen
4. Inliposomes,purityof naturalphospholipids isalso variable.
5. Difficultyin sterilization, transportation,
6. Distribution,storageuniformityofdoseandscaleup.Incompletehydrationofthelipid/surfactant filmon the walls during hydration process

7.DISADVANTAGESOFPRONIOSOMALGEL:
1.Maylead to the destruction off ragilesystems.
2.Large volumes of dialysatrequired.
3.Extremely slow (5 to 24 H).
4.Expensive instrumentation Longcentrifugation Time.
5.Gels are expensive if not reused Dilutes the noisome dispersion not suitable for highly viscous formulations.

8.CLINICALAPPLICATIONSOFPRONIOSOMES: The application of proniosomal technology is widely varied and can be used to treat a number of diseases. The following are the few uses of proniosomes which are either provenor under research.

1.Anti-NeoplasticTreatment: Most antineoplasticdrugs causeserioussideeffects. Niosomes canalterthemetabolism, prolongthe circulation and half-life of drugs, thereby reducing the adverse effects of drugs.
2.Leishmaniasis: LeishmaniasisisadiseaseinwhichaparasiteofthegenusLeishmaniainvadesthecellsofthe liver and spleen. Use of proniosome in tests conducted showed that it was possible to administerhigher levels of the drug without the triggering of the side effects, and thus allowed greater efficacy in treatment.

3.UsesInStudyingImmuneResponse: Proniosomes are used in studying immune response due to their immunological selectivity, low toxicityand greater stability. Ninsomes are being used to studythe nature of the immune response provoked by antigens. 4.ProninsomesAsCarriersForHaemoglobin: Niosomes can be used as carriers for haemoglobin within the blood. The niosomal vesicle is permeable to oxygen and hence can act as a carrier for hemoglobin in anaemic patients. Alli malarkodi S et al/Int. Pharm Tech Res 2013,5(4)17615.
5.ProniosomesUsedInCardiacDisorders: Captopril is a proninsome delivery system for the treatment of hypertension, which can effectively deliver the contained drug for a long period of time. The potential of proniosomes as a transdermal drug delivery system for captopril encapsulates the drug in various proniosome gelformulations consistingof different proportions of sorbitan fattyacid ester, cholesterol, and lecithin, prepared by a co-preservation phase separation method. It was researched by . Page12 6.AntibacterialTherapy: Amphotericin-B proliposomes could be stored for 9 months without significant changes in distribution of vesicle size and for 6 months without loss of pharmacological activity. Even though physical stability of the preparation can be increased, a vacuum or nitrogen atmosphere isstill required during preparation and storage to prevent oxidation of phospholipids.
7. CosmeticsFormulation: Today, most cosmetics on the market use liposomes and liposomes as carriers to deliver active ingredients. Inappropriateorganicsolventsareused duringliposomepreparation andresiduesinthe final formulation may harm the skin.

3 9.CONCLUSION : Captopril is a dosage system for the treatment of high blood pressure, which can effectively dose the contained medicine for a long time. The potential of proniosomes as a transdermal drug delivery system for captopril encapsulates the drug in various proniosome gel formulations consistingofdifferentproportionsofsorbitanfattyacidester,cholesterol,andlecithinprepared by a costock phase separation method.

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