LITERATURE REVIEW:

Michniak B et al., presented different type of transdermal drug delivery system. They also explained the semisolid suspension type of drug delivery system. As per presentation, they used two polymer, acrylate for loading of drug and silicone for drug release from matrix patch. They also listed the market available transdermal drug delivery system. They also described the problem related to the marketed available transdermal drug delivery system. In his presentation, they also gave information regarding to recent advance and future f transdermal drug delivery system.

Mohabe V et al., Prepared captopril transdermal patch using casting method. They used polyvinyl alcohol, ethyl cellulose, polyvinyl pyrrolidone and hydroxypropyl methylcellulose as a polymer. After manufacturing they evaluate the patch and drug permeation study revealed that formulation with the ratio of 3:1 of ethyl cellulose: povidone givs highest drug release for 24 hrs. They also concluded that combination of hydrophilic and hydrophobic polymer given good delivery compared to individual polymer.

Pao-Chu et al., described the absorption of captopril cellulose gel from rabbit and human cadaver skin. They evaluated the different concentration of captopril with different amount of saturated fatty acid as penetration enhancer and also used the different amount of gel base. They evaluated the final different formulation through rat skin and after finalization of formulation, use the humal cadaver skin to see the effect of drug delivery from gel. As per pharmacokinetic evaluation of captopril drug, 1488 mcg drug required per hour to get the desired effect of antihypertensive. The results of this study indicated that at 10% of captopril with 5% capric acid
and 22.89 cm$^2$ area required to deliver the desired amount of captopril. After investigation they also concluded that captopril is suitable candidate for transdermal drug delivery system.

**Desai BG et al.,** studied the effect of penetration enhancers on kinetic of captopril permeation for transdermal drug delivery system. They also describe the physicochemical properties of captopril for selection of model drug. They select the captopril as a model drug due to its first pass metabolism and decrease the absorption of drug in the present of food in GI track. They described the different method of drug delivery of transdermal formulation. Franz type diffusion cell was used to see the effect of penetration enhancer on captopril delivery. They studied the captopril delivery from transdermal drug delivery system up to 8 hrs. They also used the different type of penetration enhancer to improve the penetration of captopril from transdermal formulation. They used siloxine membrane as a semi permeable/artificial membrane for 8 hrs. As per his research, dimethy formamide and citral showd best penetration enhancers for captopril. They also compared the effect of sodium lauryl sulfate and sodium tauroglycholate, on penetration of captopril.

**Aqil M et al.,** used metoprolol tartrate as a model drug for manufacturing the monolithic single layer matrix type transdermal patch by molding on mercury substrate and to see the effect on drug delivery. Based on invitro analysis, it was concluded that metoprolol tartrate could be administer via skin. They used 10 mg dose of metoprolol tartrate. To saw the release in 48 hours from formulation composed with eudragit RL 100 and Povidone K-29/32 with different ratios. If they increased the amount of eudragit RL 100, delivery of drug was also increased. After complete study on drug delivery, MT-4 formulation having 8 parts of eudragit and 2 part of povidone was found to be best formulation compared to other three formulations. MT-4 was
selected as final optimized formulation. They also concluded that final formulation of metoprolol tartrate was also stable throughout self life and no further chemical interaction between excipients and metoprolol tartrate.

**Ghosh B et al.,** describe the brief review on recent trade in transdermal formulation of antihypertensive drug. They also analysed the marked patches. They described the clonidine is widely used antihypertensive transdermal formulation in market and also explained the nitroglycerene and isosbite dinitrate as a antiistemic drug. They also compared the conventional and novel drug delivery and described the patch manufacturing is costlier than conventional dosage form but market demand of transdermal clonidine patch is higher due to patient comfort.

**Jun Shil Choi et al.,** they used pressure sensitive adhesive and different type of vehicles to saw the effect on permeation of ketorolac from transdermal patch. They used Duro tak 87-2196 as acrylate polymer and propylene glycol monolurate(PGML), diethylene glycol monoethyl ether(DGME) and propylene glycol monocaprylate(PGMC) as a penetration enhancers. In the ratio of 60:40 of PGML:DGME and PGMC:DGME revealed most favourable results. After study and based on decreased Cmax and prolonged Tmax, they concluded that transdermal formulation of ketorolac can be employed longer action compared to conventional dosage form with minimum side effects.

**Gupta A et al.,** used captopril as a model drug and develop pronisomal transdermal drug deliver system. Pronisomal gel develop using different ratio of sorbitan fatty acid ester, cholesterol. Lecithin by coacervation-phase separation method. Captopril is encapsulated in pronisomal gel.
They got the 66.7-78.7% yields for encapsulation of captopril in pronisomal gel. They used transmission electron microscope for characterization of captopril pronisomal encapsulation. In vitro study showed that release of captopril was prolonged in entrapped captopril.

**Jain S et al.,** They developed captopril transdermal patch with different ratios of polymer like ethyl cellulose and HPMC hydroxypropyl methyl cellulose in the 3:1 and 2:2. They developed matrix diffusion type patch. They used different types of hydrophilic and hydrophobic type of adhesives. As per his study, HPMC gave better drug delivery compared to EC. In the ratio of 2:2, drug release was higher compared to ratio of 3:3. They also charged formulation in stability and as per stability results, captopril patch was stable for 3 months and also free from irritation.