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Transdermal patches based on solid lipid nanoparticles of Metformin: Novel approach for drug delivery of Type 2 diabetes

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Worldwide prevalence of type 2 diabetes is increasing with alarming proportions. Metformin is the first-line oral antidiabetic drug of choice for the treatment of type 2 diabetes.The objectives of the present study were to develop Metformin solid lipid nanoparticles (M-SLN) and incorporate it in the transdermal patches. M-SLN was evaluated for Particle size, Zeta potential, Surface morphology by scanning electron microscopy (SEM), Transmission electron microscopy (TEM) and In vitro- In vivo release studies. Patches were evaluated by Ex-vivo skin permeation studies. M-SLN was prepared by solvent diffusion technique using propylene glycol (solvent), polymethacrylic acid (polymer) and Soya lecithin (lipid base). After doing the evaluation of the above mentioned pharmaceutical parameters, M-SLN was loaded in Methocel K100M transdermal patches. Ex-vivo skin permeation studies were conducted on male Wistar rat's skin using Franz-type diffusion Cells. The particle size of M-SLN varied among the formulation due to variation in the composition of formulations. Zeta potential of best formulation was found to be +27mV. SEM and TEM indicates discrete spherical structure without aggregation. Drug content was found to be 1.45mg/patch. The ex-vivo permeation studies indicate that the high cumulative amount of drug is permeated from M-SLNs. Our study proves the successful delivery of M-SLN from transdermal patch, and Histopathological studies confirmed that the M-SLN transdermal patch only provoked an acceptable modest inflammatory response. These results support the feasibility of developing transdermal metformin for human applications. Thus, transdermal delivery of M-SLN is a safe, painless and cost effective drug delivery system for diabetes patients.

Biography

Navneet Sharma has completed his B. Pharma at the age of 22 years from Gautama Buddha Technical University, Lucknow, UP and his M. Pharma from JSS College of Pharmacy, JSS University, Mysore, Karnatka and Post graduate diploma in Drug regulatory affairs from Jamia Hamdard New Delhi. He has published and presented several papers in reputed journals and conferences. Currently he is doing his research as a research fellow from Institute of Nuclear Medicine and Allied Science DRDO, New Delhi, india.

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