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Solid lipid nanoparticles for brain delivery of paliperidone: Drug release kinetics, therapeutic efficacy and cyto-toxicity studies

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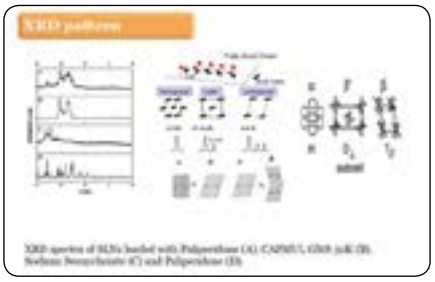
Schizophrenia is a neurological disorder and Paliperidone the antipsychotic drug with poor water solubility is potent drug used for its treatment. Solid lipid nanoparticles (SLN) based drug delivery system offer the potential for encapsulating lipophilic drugs. Three different lipids and surfactants formulations were prepared by ultrasonic homogenization method. The selection of the lipids and surfactant was based on their proven compatibility to enhance their BBB permeability and their neuro protective behaviour. The release kinetics was based on dynamic dialysis method. Detailed release mechanism analysis and its relation to the properties of system is very important. Analysis of the release kinetic data with mathematical analysis could provide a great impact on the development of solid lipid nanoparticles drug delivery system. Paliperidone a newly developed antipsychotic, which was unexpored due to low bioavailability was formulated as nanoparticles in lipid matrix analyzed for drug release kinetics. To observe the best release kinetic model, the First order, Baker-Lonsdale, Hixson-Crowell, Korsmeyer-Peppas model, and Higuchi model were implemented. Korsmeyer-Peppas model given the best fit for the release kinetics of Paliperidone from the various solid lipid nanoparticles system prepared. The results express the Gelucire based SLNs principle suitability for a prolonged release formulation. The neuro protective effects of paliperidone, on the cell survival of human neuroblastoma SH-SY5Y and RAW 264.7 macrophages was also observed for various drug concentration. GSLNs based system show 85 % cell viability from lower to higher dose.



Recent Publications:

1. Jaspreet Kaur Randhawa, (2013) High melting lipid based approach for drug delivery: Solid lipid nanoparticlesMaterials Science and Engineering: C, , 33, 1842-1852.
2. Jaspreet Kaur Randhawa(2013) Preparation and characterization of Paliperidone loaded solid lipid nanoparticles, Colloids and Surfaces B: Biointerfaces, , 102, 562-568.
3. Jaspreet Kaur Randhawa (2014) Paliperidone-loaded spherical solid lipid nanoparticles RSC Advances, 4, 30186-30192.
4. Jaspreet Kaur Randhawa (2015) RSC Advances, , 5, 68743-68750.
5. Jaspreet Kaur Randhawa (2017) Curcumin encapsulated zeolitic imidazolate frameworks as stimuli responsive drug delivery system and their interaction with biomimetic environment, 7:12598.

Biography

Jaspreet Kaur Randhawa research area includes drug delivery systems for CNS and cancers treatment: The main theme of our research includes drug delivery based on solid lipid nanoparticles (SLNs) for controlled drug release. The ability to incorporate drugs into nanocarriers offers a new prototype in drug delivery that could be used for secondary and tertiary levels of drug targeting. SLNs hold great promise for reaching the goal of controlled and site specific drug delivery. Similarly we are also working on stimuli responsive drug carrier for cancer and in the development of various nanostructures of metal oxides, and screen their glucose sensing activity to for low cost glucometer.

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