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PLGA nano carrier for targeted delivery of drugs in neuroinflammation

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Nanoscience and nanotechnology have shown unparalled growth in research and applications in recent years. There is growing hope that nanotechnology, when applied to medicine, will lead to significant advancements in disease diagnosis and treatment. Drug delivery, both in vitro and in vivo diagnostics, nutraceuticals, elicits development of more biocompatible materials for use in medicinal field.

Neuroinflammation, the response of the central nervous system (CNS) to disturbed homeostasis, typifies all neurological diseases, including developmental, traumatic, ischemic, neoplastic, infectious and neurodegenerative disorders. From several vantage point, the brain is the most arduous organ for delivering drugs. First, as the population ages, the prevalence of degenerative brain illnesses will rise. Second, the blood-brain barrier (BBB) is well-known as the body's finest drug gatekeeper against the exogenic substances. Dexamethasone is known to inhibit inflammatory response, the severe side effects associated with high dose of glucocorticoids required to reach therapeutic value, is one of the main reasons for not using dexamethasone as a neuroprotective agent. Nanotechnology offers a suitable alternative route in drug delivery. In particular, the rationale of using nanoparticle (NPs) for brain drug delivery may promote their targeting of the BBB and the enhancement of its crossing. Poly lactic-co-glycolic acid (PLGA) is the most studied and best defined polymer, approved by the Food and Drug Administration of USA (FDA) for drug delivery and pharmacological studies. In this study we attempted to determine the most efficient method for the synthesis of doped PLGA nanoparticles for drug delivery applications and varying the type of surfactants used and its role in drug delivery.

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