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A Drug Delivery Formulation to Prevent Neurologic Complications in Preterm Births

Stanford scientists have developed a prolonged drug-releasing formulation for delivering an iron chelation therapeutic to central nervous system in preterm births to prevent post-hemorrhagic hydrocephalus (PHH) in severe neonatal intraventricular hemorrhage (IVH)

In preterm births, neonatal IVH can lead to PHH, a severe neurological complication that results in damage to the developing brain. Current treatment options for PHH are limited to surgical interventions with high risk of complications, as there are no medical therapies available to prevent its development. Iron toxicity from the degradation of hemoglobin, a major component of blood cells, is a key driver of PHH, presenting an opportunity for non-surgical intervention. Existing iron chelation therapies, such as deferoxamine (DFO) and deferasirox (DFX), have shown promise in preclinical models but requires repeated intraventricular deliveries to keep the optimum concentration for iron chelation without inducing secondary toxicity.

This invention utilizes a polymer matrix for sustained drug release of iron chelation agents, reducing the need for repeated interventions and ensuring optimal therapeutic concentration. This approach could finally provide doctors with the chance to prevent PHH during the critical post-IVH period, sparing these vulnerable patients from the need for invasive procedures.

Applications

- Prevention of post-hemorrhagic hydrocephalus in neonates
- Treatment of other iron-related neurological disorders
- Drug delivery platform for other CNS diseases

Advantages

- Sustained drug release profile for optimal dosage control
- Targeted delivery to the central nervous system
- Reduced the number of interventions to prevent procedure related complications
- Non-surgical intervention to prevent PHH
- Rare disease with no therapeutic available in clinic

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