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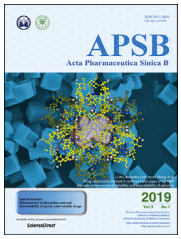

ORIGINAL ARTICLE

ROS-removing nano-medicine for navigating inflammatory microenvironment to enhance anti-epileptic therapy

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Abstract As a neurological disorder in the brain, epilepsy is not only associated with abnormal synchronized discharging of neurons, but also inseparable from non-neuronal elements in the altered microenvironment. Anti-epileptic drugs (AEDs) merely focusing on neuronal circuits frequently turn out deficient, which is necessitating comprehensive strategies of medications to cover over-exciting neurons, activated glial cells, oxidative stress and chronic inflammation synchronously. Therefore, we would report the design of a polymeric micelle drug delivery system that was functioned with brain targeting and cerebral microenvironment modulation. In brief, reactive oxygen species (ROS)-sensitive phenylboronic ester was conjugated with poly-ethylene glycol (PEG) to form amphiphilic copolymers. Additionally, dehydroascorbic acid (DHAA), an analogue of glucose, was applied to target glucose transporter 1 (GLUT1) and facilitate micelle penetration across the blood−brain barrier (BBB). A classic hydrophobic AED, lamotrigine (LTG), was encapsulated in the micelles *via* self-assembly. When administrated and transferred across the BBB, ROS-scavenging polymers were expected to integrate anti-oxidation, anti-inflammation and neuro-electric modulation into one strategy. Moreover, micelles would alter LTG distribution *in vivo* with improved efficacy. Overall, the combined anti-epileptic therapy might provide effective opinions on how to maximize neuroprotection during early epileptogenesis.

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