Joint Event on

Breast Cancer & Cancer Therapy

August 05-06, 2021 | Webinar

Biodistribution of Fluorescence-labelled EGF Protein from Slow Release NanoZolid Depots in Mouse

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Abstract— Aim: The study was designed to evaluate the ability of the calcium sulfate based NanoZolid® drug delivery technology to locally release the epidermal growth factor (EGF) protein while maintaining its biological activity.

Methods: NanoZolid-formulated EGF protein labelled with a near infrared dye (EGF-NIR) depots or EGF-NIR dissolved in PBS were injected subcutaneously into mice bearing EGF receptor (EGFR) positive human A549 lung cancer tumors inoculated subcutaneously. The release and biodistribution of the EGF-NIR were investigated in vivo longitudinally up to 96 hours post administration, utilizing whole body fluorescence imaging. In order to confirm the in vivo findings, histological analysis of tumor cryosections was performed to investigate EGF-NIR fluorescent signal and EGFR expression level by immunofluorescence labelling.

Results: The in vivo fluorescence imaging showed a controlled release profile of the EGF-NIR loaded in the NanoZolid depots compared to free EGF-NIR. Histological analysis of the tumors further demonstrated a prevailing distribution of EGF-NIR in regions with high levels of EGFR expression.

Conclusion: Calcium sulfate based depots can be used to formulate EGF while maintaining its biological activity, e.g. receptor binding capability. This may have a good clinical potential for local delivery of biomolecules to enhance treatment efficacy and minimize systemic adverse effects.

Biography:
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