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Electromagnetic Drug Delivery Using EM Responsive Polypyrrole Nanowires

An electromagnetic drug delivery system utilizing polymer nanowire matting enables noninvasive, controlled release of therapeutics for localized targeting, maximizing dosage effectiveness while minimizing systemic side effects.

Targeted drug delivery methods aim to confine the concentration of medication in some body parts relative to others. The goal of such treatments is to target only the diseased tissue maximizing the effectiveness of each dose and reducing negative side effects in other tissues. Cancer treatment is one of the most highly researched areas within targeted drug delivery due to the potential of therapies that target tumors, avoiding the nonspecific side effects of chemotherapy.

Researchers at Purdue University have developed an electromagnetic drug delivery system constructed of polypyrrole (PPy) nanowire matting. This material is designed to act as a reservoir for drugs, and is responsive to an externally applied electromagnetic field (EMF) that induces the release of the captured drug into the local environment. Delivery can be turned on or off by using the noninvasive EMF source located remotely from the PPy drug reservoir. The therapeutic agent can be delivered from the inserted or surgically placed PPy mat for many weeks, and the specific region that is targeted can receive very high drug concentrations while systemic regions remain unaffected.

Advantages:

-Localized drug targeting

-Dosage control

-Reduction in negative, systemic side effects

Potential Applications:

-Medical/Health

-Pharmaceutical Industry

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Category
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