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PLA-PCL Microsphere Formulation to Deter Abuse of Prescription Opioids by Smoking

PLA–PCL microspheres entrap opioids during heating to block smoking abuse routes.

Researchers at Purdue University have developed a new method to prevent smoking of opioids and other drugs. Although approximately one-third of opioid abusers in the U.S. reported smoking opioids, no abuse deterrent formulation exists for this abuse route. The Purdue researchers created a microsphere polymer formulation that can be added to opioids to entrap the drugs and their thermal degradation products when smoked. The researchers tested the ability of microspheres prepared from polylactic acid (PLA) and polycaprolactone (PCL) to limit the escape of vaporized thebaine, a model opioid drug. When heated at a rate of 20 degrees Celsius/minute, PLA-PCL microspheres made of a 1:9 molar ratio of PLA to PCL reduced the amount of active drug in the vapor compared to thebaine alone at a statistically-significant level ($p = 0.033$). Under the same treatment regime, the formulation also reduced the amount of degradation products in the vapor phase compared to thebaine alone at a statistically-significant level (p0.001). Additionally, the microspheres prepared by the researchers are smaller than the diameter of human capillaries, making them safe to use in patients.

Technology Validation: PLA-PCL microspheres at a 1:9 ratio of PLA:PCL significantly reduced the amount of active drug and degradation products in the vapor.

Advantages

- Biocompatible

- Effective

- Safe

Applications

Technology ID
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Category
Pharmaceuticals/Drug Discovery & Development
Pharmaceuticals/Pharmaceutical Packaging & Delivery Systems

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- Prevent smoking of opioids and other drugs

TRL: Pharmaceuticals

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