Submission Summary

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Paper Title
Implantable and inhalable nano-scale biosensors for point-of-care diagnosis

Abstract
Background: Implantable and inhaled nanosystems have demonstrated multiple effects including inflammation and thrombosis at the site of administration. However in recent years, such systems have been deployed as nanobiosensors to offer a discreet and continuous means of monitoring physiological parameters within the human body. Objective: This study aims to compare the effects of the particulate characteristics of nanobiosensors on their physiologic effects and pharmacokinetics. Sensors were restricted to implantable and inhalable systems. Methods: Investigations of nanobiosensors were compared with respect to material of construction, size, quantity administered, duration and frequency of administration, Results: Designed with biocompatible materials and miniaturized sensing elements, these devices can be implanted in target tissues or organs, providing real-time data on biomarkers associated with various health conditions. Inhalable nanobiosensors present a non-invasive approach to health monitoring by using respiratory pathways for sensor deployment. Engineered to be aerosolized and easily inhaled, these nanosensors traverse the respiratory system, reaching specific cellular targets. Inhalable nanobiosensors excel in monitoring respiratory conditions, detecting biomarkers indicative of lung diseases, and offering insights into environmental exposures. The non-intrusive nature of inhalable sensors makes them attractive for population-scale health surveillance and early warning systems. Both implantable and inhalable nanobiosensors share common principles of design, employing nanomaterials and fabrication techniques. They can wirelessly transmit data to external devices for patient convenience and facilitates remote healthcare monitoring. Conclusion: Challenges related to biocompatibility, long-term stability, and ethical considerations are actively being addressed to ensure the safe and effective deployment of these nanobiosensors in clinical settings.

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