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Dry Powder Intranasal Oxytocin for Treatment of Postpartum Hemorrhage in the Developing World

Adrian Goodey

Merck Research Laboratories

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The MSU Sustainability Seminar Series Presents:

Dry Powder Intranasal Oxytocin for Treatment of Postpartum Hemorrhage in the Developing World

WHEN: March 27, 4:00 pm

WHERE: CELS 120 lecture hall

Adrian Goodey
Merck Research Laboratories



Adrian Goodey is a Principal Scientist in the Specialty Dosage Forms group within Merck Research Laboratories. In this role, Dr. Goodey leads the development of drug products delivered via alternate routes of administration, including inhalers, nasal sprays and subcutaneous implants. His research interests include advancing the science of aerodynamic particle sizing and the development of clinically relevant analytical methods for pharmaceutical testing. To date, he has authored fourteen peer-reviewed scientific articles and two patents.

Complications related to pregnancy and child birth claim nearly 800 women's lives each day. This tragedy is compounded by the fact that the vast majority of these deaths are preventable. However, ninety-nine percent of maternal deaths occur in the developing world where basic medical services and supplies are typically scarce. Postpartum hemorrhage (PPH; excessive bleeding after child birth), accounts for nearly 25% of maternal deaths globally, and is an especially acute concern in resource-scarce settings. The pharmacological treatment recommended for PPH by the World Health Organization, oxytocin, is incompatible with regions where reliable refrigeration is unavailable. Typically formulated as an aqueous solution for injection, oxytocin rapidly loses efficacy at room temperature via chemical degradation. In the present work, we explore the feasibility of adapting oxytocin from its standard injectable solution form to a dry powder formulation for intranasal administration. A preclinical evaluation reveals an impressive 12% bioavailability (relative to intramuscular injection) with sufficiently rapid onset for treatment of PPH. Moreover, in-vitro characterization confirmed good physical and chemical stability, offering hope that dry powder oxytocin formulations for intranasal delivery may be a viable option for treatment of PPH in the developing world.