

## Introduction

Microencapsulation of pharmacologic agents can be used to enable the delayed release, sustained release or targeted delivery of active pharmaceutical ingredients. In addition, microencapsulation can be used to mask unpleasant taste and to protect the encapsulated pharmacologic agent from environmental influences such as oxidation or contact with other incompatible material/actives.

## MicroPET

*MicroPET* is a new high yielding method of producing microcapsules for application in the controlled release, sustained release and/or targeted delivery of pharmacologic agents including biologicals. The process, based on spray drying, uses a specifically designed concentric nozzle system so that particles emerge ready-formed from a single-step, scalable process. The resulting microcapsules can be further processed into other dose forms.

Feature	Benefit
Ability to control microcapsule size	Particles ranging in size from 1 to 100microns can be formulated
Versatile encapsulation process	Encapsulation of solid, liquid or gaseous "cores" possible with a wide range of coating materials
Multiple "layers" of encapsulation possible	Enables the sequential and controlled delivery of more than one pharmacologic agent
Produces small free-flowing drug particles	Enhanced drug stability, dispersibility and dissolution
Benefits proven <i>in vitro</i> cell models and <i>in vivo</i> pre-clinical models	Targeted delivery of biological therapeutics including vaccines

## Intellectual Property

*MicroPET* intellectual property is protected by granted patents in Ireland, UK, Germany and France. US patent current pending

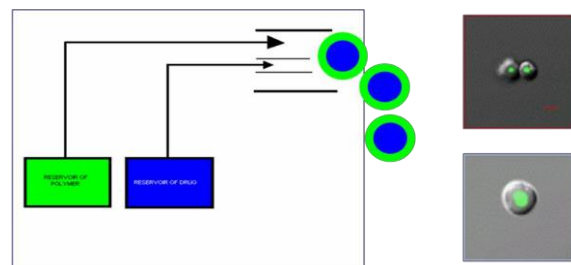


Figure 1: Schematic of RCSI's *MicroPET* technology and electron micrographs of 1 micron particles showing a fluorescent core encapsulated by a biodegradable polymer coat

## Applications

- Targeted delivery of pharmacologic agents including biologicals and vaccines through intradermal, intramuscular, subcutaneous, intranasal, pulmonary and oral routes
- Formulation of problematic new chemical entities (NCEs)
- Refinement and repurposing of existing active pharmaceutical ingredient (APIs)
- Novel aqueous based encapsulation process for biological therapeutics
- Development of microencapsulated materials for application in pharmaceutical, food, cosmetic and other industries

## Advantages

The use of RCSI's *MicroPET* technology has been shown to enhance the uptake of pharmacologic agents in both *in vitro* and *in vivo* models and is particularly relevant to insoluble compounds where small free-flowing drug particles coated with a surface stabiliser are desirable to enhance drug dispersibility and dissolution. Unlike other encapsulation technology, such as solvent evaporation from emulsions where the solvents used must be immiscible, this new technology allows formation of microcapsules using liquids which are completely miscible.