The growing commercial interest in exosomes as diagnostics and therapeutics has given rise to an urgent need for an efficient labelling and detection method that does not alter their inherent characteristics. RCSI has developed a method which for the first time allows for the endogenous labelling of exosomes using an NIR-fluorescent probe without the need for immunolabelling or synthetic or chromatographic manipulation.

VALUE PROPOSITION

Exosomes are being actively developed by Pharma companies as therapeutic delivery vectors for biomolecules, such as transcription factors, mRNA and miRNAs. Diagnostically, their protein and nucleic acid signatures can also be used as prognostic markers in liquid biopsies and as biomarkers of diseases. Current methodologies for exosome labelling and isolation are complex and require immuno-labels, reagents for conjugation reactions or chromatographic purifications which are a major cost point and bottleneck in their manufacture and QC on a commercial scale due to loss of exosome integrity via surface modifications, chemical contamination with conjugation reagents or physical damage during chromatographic purification.

To address these issues, RCSI has developed a mild, straightforward, endogenous method to produce NIR-labelled exosomes, in which the cells themselves carry out the labelling prior to secretion of the vesicle. The ease of production, excellent stability and NIR-emission properties of the RCSI fluorescence probe offers a valuable and cost-effective solution for Pharma companies involved in exosome research and development.

TECHNOLOGY

Fluorescence is the tool of choice for probing the molecular processes of biological systems. Fluorescent probes with near-infrared (NIR) wavelengths offer an added benefit of direct translation from cellular to in vivo usage due to the penetration of NIR-light through body tissue. BF2-azadipyrromethene(NIR-AZA) fluorophores are an emerging class of NIR-fluorophores, which have grown in reputation as their properties can be tailored to match specific functional uses. RCSI has identified a novel NIR-AZA probe which following cellular internalization leads to endogenous intracellular exosome labelling.
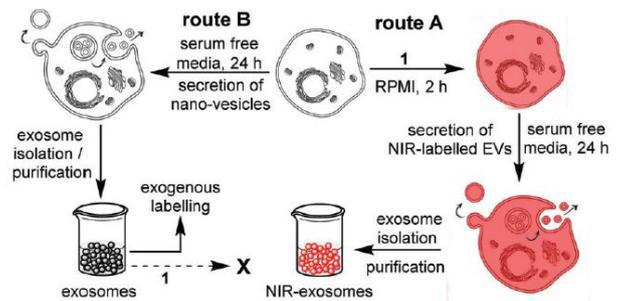

Fig 1. Comparison of current (exogenous) methods and the new endogenous exosome labelling method with the RCSI NIR Fluorescent probe.

- **FEATURES AND BENEFITS**

Features	Benefits
Allows for the endogenous labelling of exosomes without loss of biological integrity and function	Facilitates scale-up, detection and isolation of novel exosome-based therapeutics and diagnostics
Excellent photostability and tuneable chemistry of the NIR-AZA fluorophore class	Facilitates in vitro sorting of extracellular vesicles (FACS) and also has potential applications in in vivo imaging (IVIS)

- **APPLICATIONS**
  - EXOSOME LABELLING FOR DIAGNOSTIC AND THERAPEUTIC DEVELOPMENT

- **TECHNOLOGY READINESS LEVEL**
  - IN VITRO PROOF OF CONCEPT
  - PATENT PROTECTED

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