

Oral administration of fluorescent films for prolonged delivery of optical imaging agents

A team of researchers at Stanford and the University of Connecticut have developed a method to deliver contrast agents through a patient-friendly sublingual or buccal film that provides prolonged continuous release for ongoing optical imaging. Currently fluorescent dyes for optical imaging are administered intravenously by injection, which is invasive and inconvenient for the patient. Dyes delivered this way have a very short half-life in circulation and multiple injections are needed to monitor disease progression. This new technology solves that problem using a film formulated to be administered orally and provide steady release of the dye so that imaging can continue for up to 12 hours. This feature is particularly useful for prolonged visualization during surgery. These fluorescent films could enable non-invasive and non-radioactive fluorescent imaging with formulations optimized for either visualizing the upper gastrointestinal tract or for systemic absorption to monitor inflammation and infection.

Stage of Research

The inventors have demonstrated proof of concept with in vivo fluorescence imaging and pharmacokinetics studies in mice using two different film formulations and two different imaging dyes. They are continuing their work to optimize dye load and dye dissolution performance.

Applications

- **Optical imaging** - sublingual or buccal films to replace contrast dye injections for fluorescent and photoacoustic imaging, with end user applications such as:
 - diagnostics - identifying cancerous lymph node metastases

- monitoring inflammation and infection (e.g., tracking disease progression in diabetic foot ulcers and rheumatoid arthritis)
- pediatric swallow evaluation
- microscopic or endoscopic imaging of gastrointestinal tract for surgery

Advantages

- **Prolonged delivery:**

- long half-life in circulation - signal remains above background for up to 12 hours
- continuous release formulation enables hours of imaging compared with IV contrast agents which only allow 3 minutes to complete imaging

- **Patient-friendly delivery:**

- oral administration with sublingual or buccal film
- no IV or injection needed
- can be used in pediatric patients without IV access
- non-radioactive

Publications

- O'Reilly et al. Scientific Reports (2020) a href = "https://doi-org.stanford.idm.oclc.org/10.1038/s41598-020-71054-2"> "Sublingual indocyanine green films for non-invasive swallowing assessment and inflammation detection through NIR/SWIR optical imaging"

Patents

- Published Application: [WO2019191734](#)
- Published Application: [20210023244](#)

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