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Improved Shortwave Infrared Polymethine Dyes

Tech ID: 29912 / UC Case 2017-726-0

SUMMARY

UCLA researchers in the Department of Chemistry and Biochemistry have developed improved bright and non-toxic polymethine dyes that will expand current medical optical imaging capabilities.

BACKGROUND

As compared to light in the visible and near infrared (NIR) regions of the electromagnetic spectrum, light in the shortwave infrared (SWIR) region exhibits less interaction with animal tissue leading to deeper images with enhanced resolution images. Materials that emit light in the SWIR region are thus superior contrast agents than their visible and NIR counterparts and are ideal for use in tissue imaging. Quantum dots, carbon nanotubes, and rare-earth metal-based probes are commonly employed for SWIR imaging, yet concern over these materials' toxicity continues to limit their utility. Similarly, small organic molecules with SWIR emission known as donor-acceptor-donor small molecules have been presented for imaging, but these molecules necessitate excitation in the NIR and thus cannot take full advantage of the enhanced resolution and depth penetration of the SWIR region.

INNOVATION

UCLA researchers in the Department of Chemistry and Biochemistry have developed improved bright and non-toxic polymethine dyes that will expand current medical optical imaging capabilities. The improved polymethine fluorophores exhibit a wider range of photophysical properties than existing imaging materials and will allow for the extraction of more useful and detailed information regarding complex biological systems in vivo.

APPLICATIONS

- ▶ Image-guided surgery
- ▶ Whole animal and human imaging
- ▶ SWIR sensors

ADVANTAGES

- ▶ Bright
- ▶ Non-toxic
- ▶ Wide range of photophysical properties

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	11,292,778	04/05/2022	2017-726
European Patent Office	Published Application	EP3891224	10/13/2021	2017-726
European Patent Office	Published Application	3634397	04/15/2020	2017-726

Additional Patent Pending

RELATED MATERIALS

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INVENTORS

- ▶ Sletten, Ellen M.

OTHER INFORMATION

KEYWORDS

polymethine dyes; polymethine fluorophores; SWIR imaging; image-guided surgery; fluorescence imaging

CATEGORIZED AS

- ▶ **Optics and Photonics**
 - ▶ All Optics and Photonics
- ▶ **Imaging**
 - ▶ Medical
- ▶ **Medical**
 - ▶ Imaging

RELATED CASES

2017-726-0

▶ Sletten, E.M.; Swager, T.M. "Fluorofluorophores: fluorescent fluororous chemical tools spanning the visible spectrum." J. Am. Chem. Soc. 2014, 136, 13574-13577.

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- ▶ Disulfide Bioconjugation
- ▶ Tunable Linear Fluoropolymers

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