Dual Color Imaging from a Single BF$_2$-Azadipyrrromethene Fluorophore Demonstrated in vivo for Lymph Node Identification

Niamh Curtin,1 Dan Wu,1 Ronan Cahill,2 Anwesha Sarkar,2 Pól Mac Aonghusa,3 Sergiy Zhuk,3 Manuel Barberio,4 Mahdi Al-Taher,4 Jacques Marescaux,5 Michele Diana,4,5,6 Donal F. O’Shea1*

1Department of Chemistry, Royal College of Surgeons in Ireland, RCSI, 123 St Stephen’s Green, Dublin 2, Ireland.
2UCD Centre for Precision Surgery, School of Medicine, University College Dublin, Ireland; Department of Surgery, Mater Misericordiae University Hospital, Dublin, Ireland.
3IBM Research – Ireland, Damastown Industrial Estate, Mulhuddart, Dublin 15, Ireland.
4IHU-Strasbourg, Institute of Hybrid Image-Guided Surgery, Strasbourg, France.
5IRCAD, Research Institute against Cancer of the Digestive System, Strasbourg, France.
6ICube Lab, Photonics Instrumentation for Health, Strasbourg, France.

Supporting Information

Legends for Movies S1-5

Movie S1: Fluorescence intensity map showing syringe containing 1, injection site and ICG reference card as shown in Figure 10.
Movie S2: Lymphatic mapping with 1 using 800 nm emission as shown in Figure 11.
Movie S3: Lymphatic mapping with 1 using 700 nm emission as shown in Figure 12.
Movie S4: Lymph node mapping at 800 nm using 1 in porcine colorectal tissue using Stortz clinical laparoscopic instrument.
Movie S5: Lymph node mapping at 800 nm using 1 in ex vivo human colorectal tissue using Stryker laparoscopic instrument as shown in Figure 13.

Figure S1: Fluorescence spectrum of J-aggregated 1
Figure S2: Stability of 1 in 2.5 mM PBS/EL solution
Figure S3: Imaging 1 with a Stortz clinical 800 nm laparoscopic system
Figure S4: NMR spectra for 1.
Figure S1. Fluorescence spectrum of J-aggregated 1 with excitation at 800 nm.

Figure S2. Fluorescence spectra of 1 at 2.5 mM PBS/EL upon storage for 1 week. Day 1 (black trace), day 2 (red trace), day 3 (green trace), day 7 (yellow trace).
**Figure S3.** Imaging with a Stortz clinical 800 nm laparoscopic system in a porcine model showing colonic lymph channel and lymph node. Panel A and B: while light image showing injection of 1. Panel C: fluorescence imaging showing injection site and lymphatic channel. Panel D: fluorescence image showing lymph node. See SI Movie S4 for video.
Figure S4: $^1$H NMR (400 MHz, DMSO-$d_6$) of 1

$^{13}$C NMR (100 MHz, DMSO-$d_6$) of 1
$^{19}$F NMR (375 MHz, DMSO-$d_6$) of 1

$^1$H COSY (DMSO-$d_6$) of 1