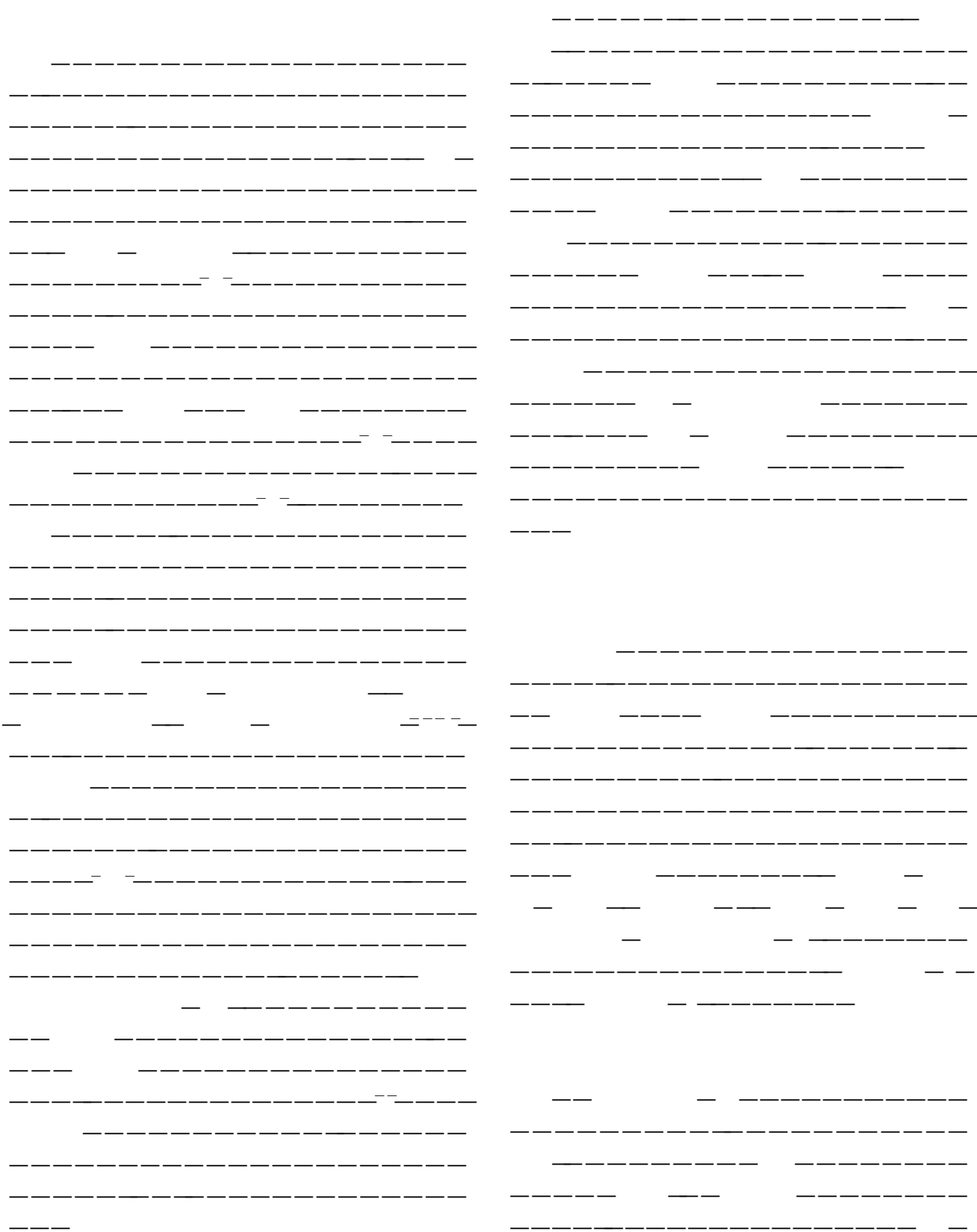
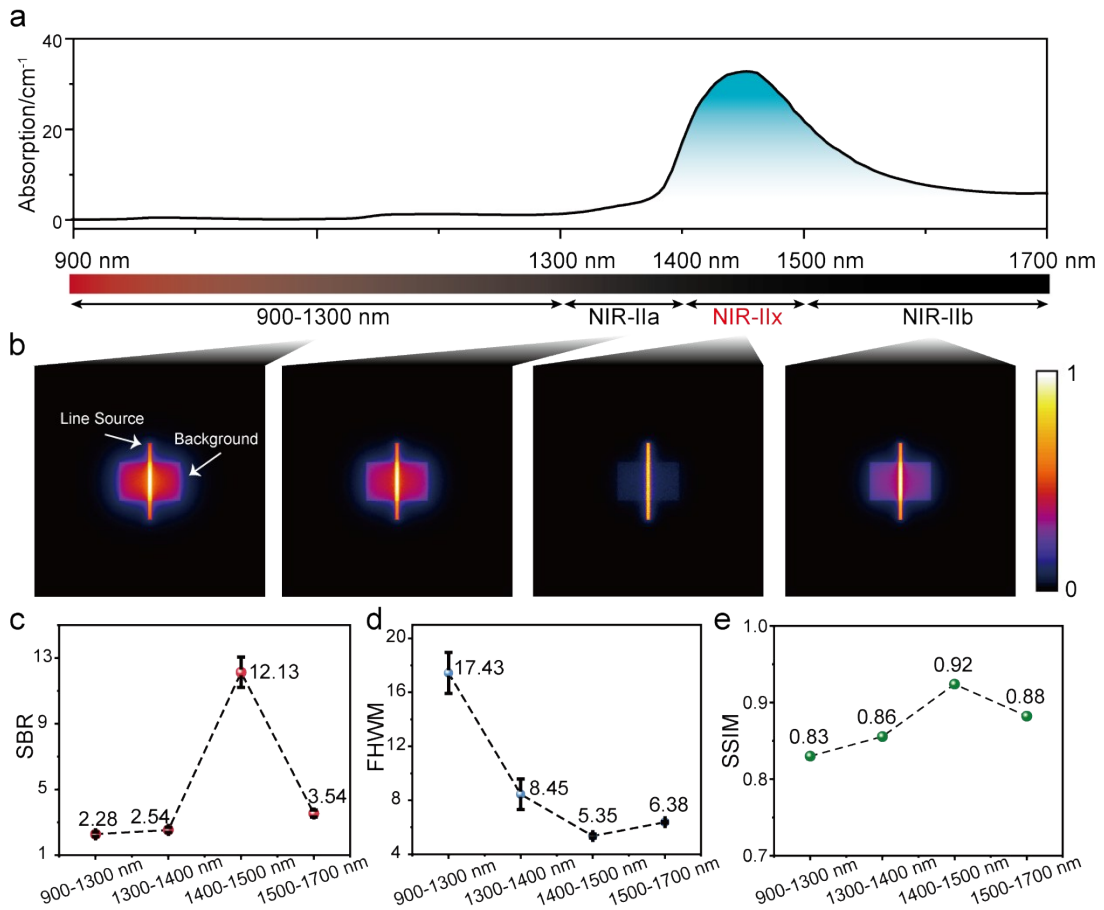


NIR-II fluorescence imaging demonstrates significant advantages in biological imaging with its high signal-to-background ratio (SBR) and deep tissue penetration, showing broad application prospects in biomedical fields. The classification of NIR-II imaging windows facilitates the optimization of imaging processes. Among these, the 1400-1500 nm imaging window benefits from its unique water absorption characteristics, enabling effective suppression of scattering background and achieving high-contrast imaging. This study systematically evaluates the imaging potential of the 1400-1500 nm window through simulation studies and in vivo experiments. To advance the clinical translation of fluorescence imaging in the 1400-1500 nm window, indocyanine green (ICG)—an organic small-molecule dye approved by the U. S. Food and Drug Administration (FDA)—was employed as the fluorescent probe. Utilizing its extended fluorescence emission tail in the NIR-II region, high-contrast and high-resolution imaging of mouse vasculature and intestinal structures was achieved in the 1400-1500 nm window. Furthermore, in combination with methylene blue (MB)—another FDA-approved agent—high-quality dual-channel NIR-II imaging was successfully implemented enabling precise localization of blood vessels and lymph nodes in mice. This research further explores the unique advantages of the 1400-

1 500 nm imaging window in biological imaging and its clinical application potential. It also provides valuable referenc-
es for the clinical translation of NIR-II fluorescence imaging.

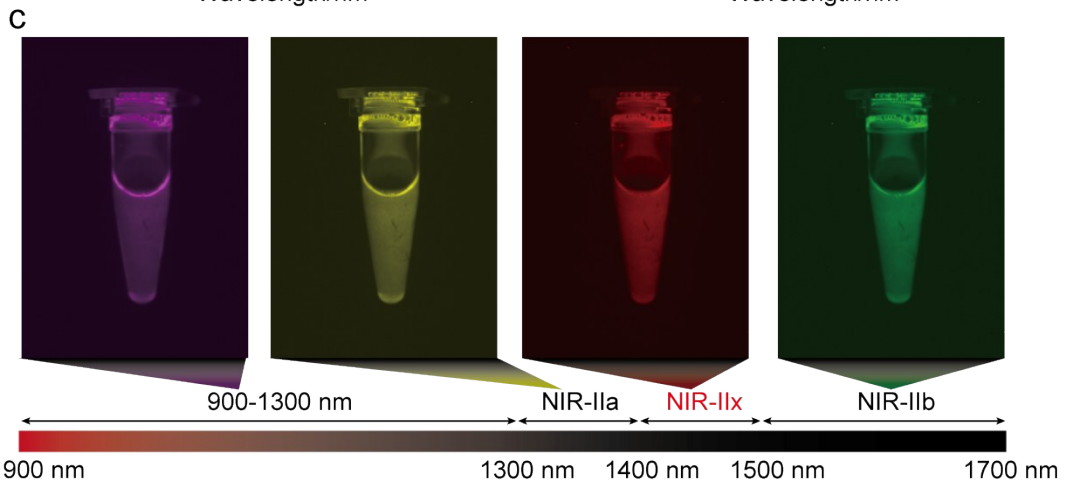
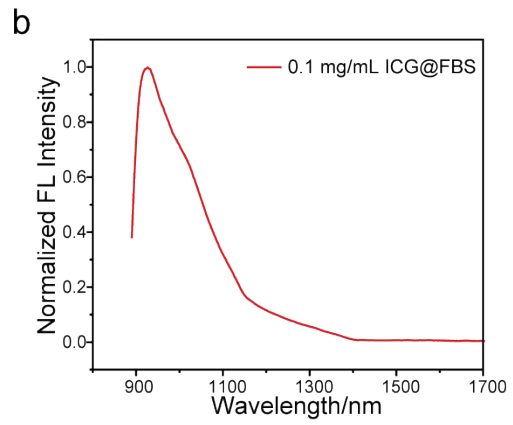
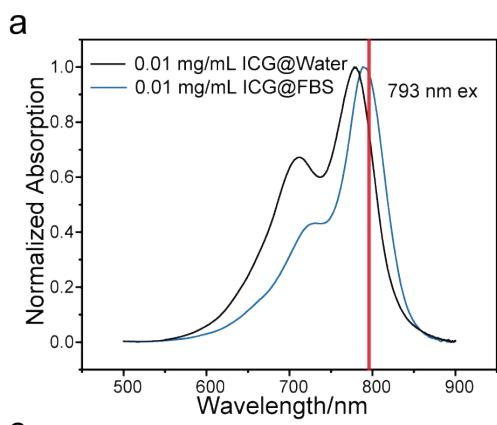
—fluorescence imaging—NIR-IIx—NIR-II—dual-channel imaging—clinical surgical navigation





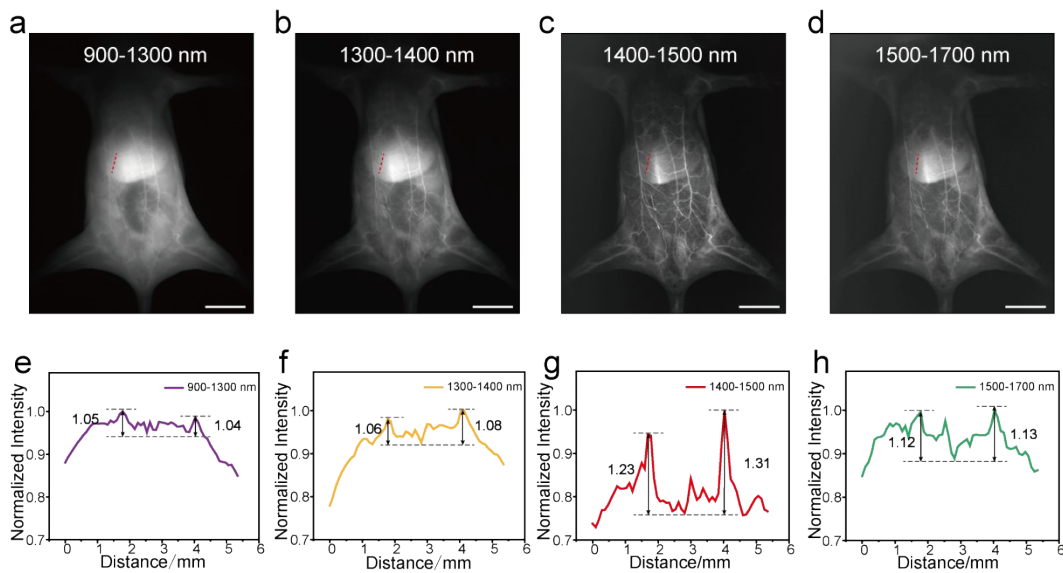
— 1—NIR-II ——— Monte Carlo ———

Fig. 1—Simulation results of NIR-II bioimaging by Monte Carlo method—



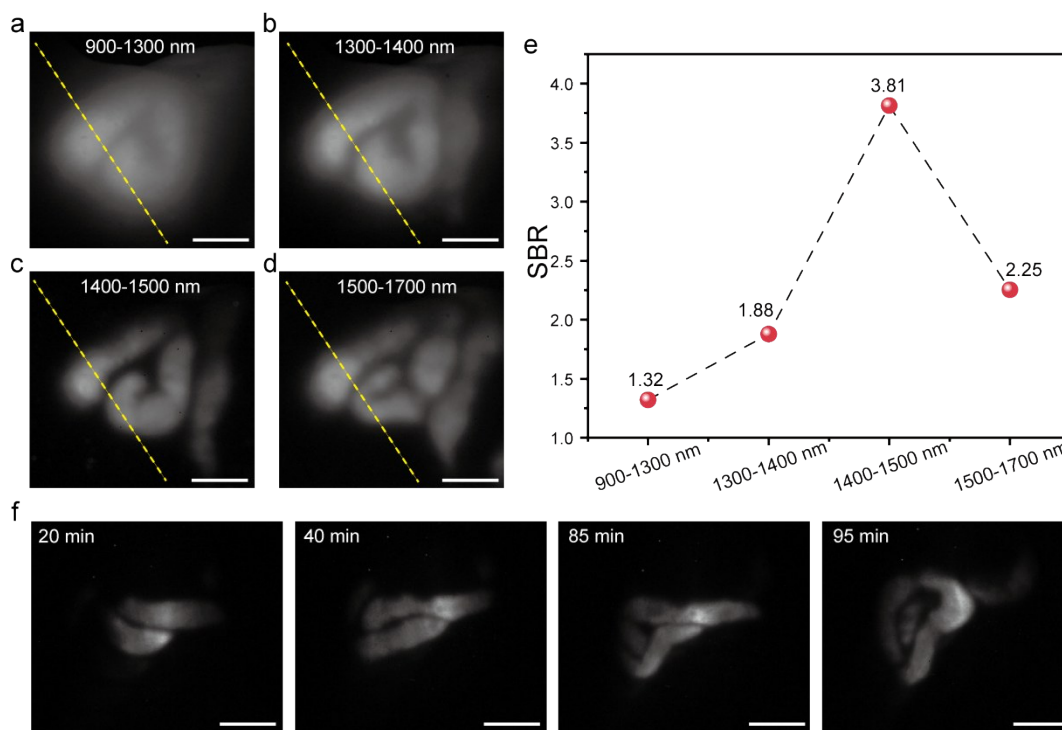
— 2—ICG —

Fig. 2—Optical characterization of ICG —



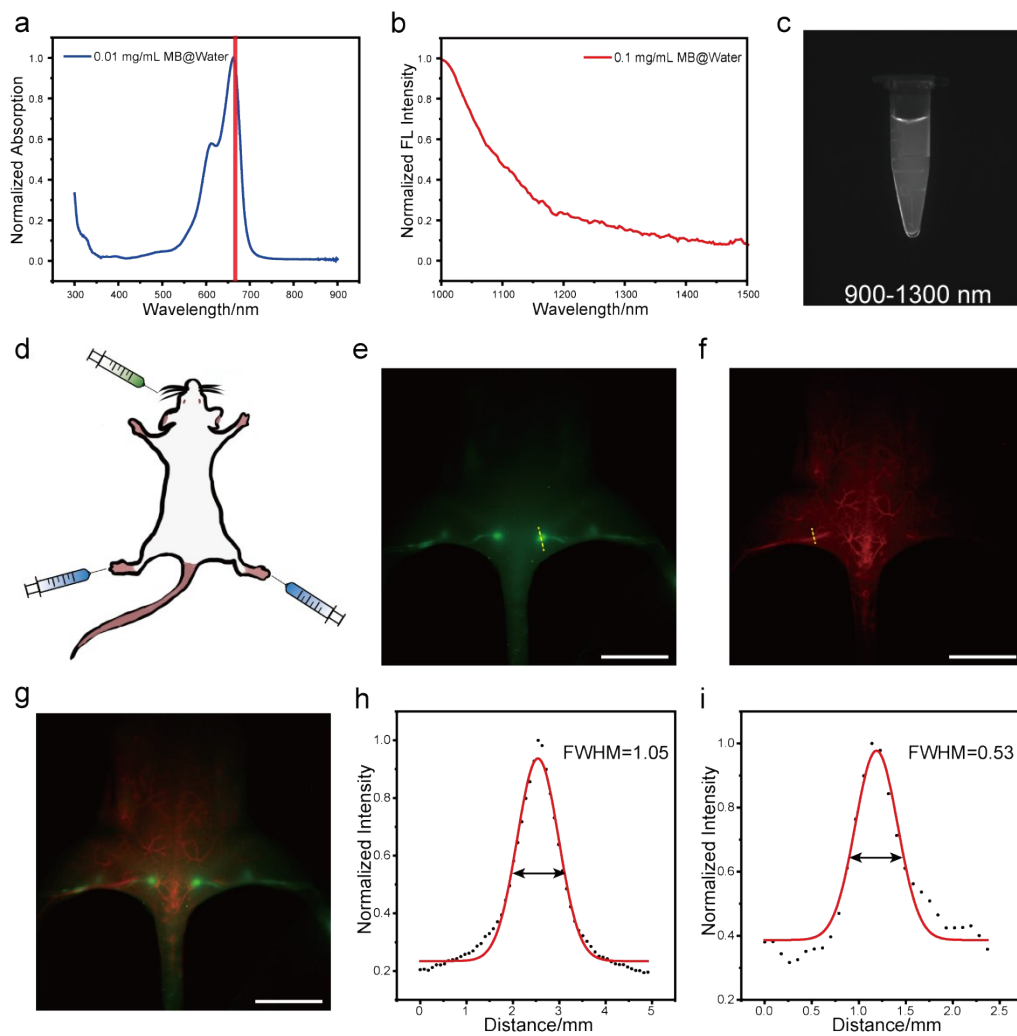
— 3 ———— NIR-II ————

Fig. 3— NIR-II fluorescence imaging of whole-body vasculature in mice. —



4 NIR-II

Fig. 4—NIR-II fluorescence imaging of mouse intestine.



— 5 —

Fig. 5—Dual-channel imaging of lymph nodes and blood vessels in mice—

