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Novel two-photon dyes: Minimal autofluorescence in tissue imaging

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The advantage of fluorescent imaging for biomaterials is operationally simple, cost-effective, noninvasive, high sensitive detection and visualization of organisms at a subcellular level. In tissue imaging, however, autofluorescence from biological molecules under excitation at UV–Vis wavelengths lowers signal to noise ratio. Most of biomolecules absorb and emit light of green region. So, a novel class of fluorophores excited in the near-infrared region is necessary to suppress this critical issue. Two-photon absorbing dyes are one of the methods to satisfy this criterion. They have several advantages not only reduced autofluorescence, but also increased penetration depth, and high special-resolution. In addition, they diminish photodamage and photobleaching as well. Acedan, 6-acetyl-2-(dimethylamino) naphthalene, and its derivatives are widely used for two-photon dyes. But their maximum absorption wavelengths (~370 nm) are rather short for two-photon excitation (~740 nm) which shows strong autofluorescence and limits the depth in tissue in microscopic imaging of tissues. Herein, we have developed compact π-extended acedan derivatives. They have the longer maximum absorption wavelengths more than 400 nm and sufficient two-photon absorption properties. One of the new dyes that can be excitable at 1000 nm under two photon excitation condition is photochemically stable and biocompatible. Also it has environment-sensitivity and readily penetrate the blood-brain barrier, allowing *in vivo* fluorescence imaging of Aβ plaques in a live mouse model of Alzheimer's disease.

Biography

Juryang Bae received her BS from Pusan National University in 2013. Currently, she is a PhD candidate at Pohang University of Science and Technology (POSTECH).

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