

## Oral Presentation

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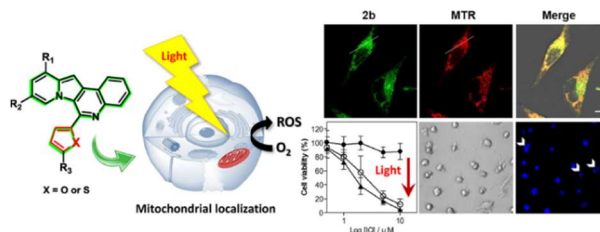
#### Indolizino[3,2-*c*]quinolines (IQs), a fused heterocyclic system for the development of novel fluorescent probes using live cell imaging

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#### Abstract

Live cell imaging using small organic fluorophores has emerged as a powerful non-invasive approach to visualizing a variety of cellular processes. We reported the design and synthesis of indolizino[3,2-*c*]quinolines (IQs), a fused heterocyclic system, as a potential candidate for novel fluorescent probes. This presentation will describe the environment-sensitive features of the IQs in a cellular context using no-wash live cell imaging with precise spatial control. We also present mitochondria-targeting 6-(furan-2-yl)- and 6-(thiophen-2-yl) indolizino[3,2-*c*]quinolines as novel photosensitizers (PS). Among the synthesized compounds, **2b**, which contains a furan ring, showed dual functions as an imaging probe as well as a PS. Very recent results will illustrate a novel class of fluorescent metal sensors derived from IQ scaffold that exhibit high selectivity for Fe<sup>3+</sup> over other biologically abundant cations in cells. The properties of the IQs described here suggest that these compounds may serve as important tools for investigating dynamic processes in live cells.



#### References

1. Kwon, S.; Kwon, D. I.; Jung, Y.; Kim, J. H.; Lee, Y.; Lim, B.; Kim, I.; Lee, J., Indolizino[3,2-*c*]quinolines as environment-sensitive fluorescent light-up probes for targeted live cell imaging. *Sensor Actuat. B-Chem.* **2017**, *252*, 340-352.
2. Kwon, S.; Lee, Y.; Jung, Y.; Kim, J. H.; Baek, B.; Lim, B.; Lee, J.; Kim, I.; Lee, J., Mitochondria-targeting indolizino[3,2-*c*]quinolines as novel class of photosensitizers for photodynamic anticancer activity. *Eur. J. Med. Chem.* **2018**, *148*, 116-127.
3. Lim, B.; Baek, B.; Jang, K.; Lee, N. K.; Lee, J. H.; Lee, Y.; Kim, J.; Kang, S. W.; Park, J.; Kim, S.; Kang, N. W.; Hong, S.; Kim, D. D.; Kim, I.; Hwang, H.; Lee, J., Novel turn-on fluorescent biosensors for selective detection of cellular Fe<sup>3+</sup> in lysosomes: Thiophene as a selectivity-tuning handle for Fe<sup>3+</sup> sensors. *Dyes Pigments* **2019**, *169*, 51-59.

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### EDUCATION & TRAINING

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### ACADEMIC CAREERS

**Seoul National University**, Associate Professor (2016.3 - present)

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### SELECTED PUBLICATIONS

Lim B, Lee J, Kim B, Lee R, Park J, Oh DC, Gam J, **Lee J\*** Target identification of a 1,3,4-oxadiazin-5(6H)-one anticancer agent via photoaffinity labelling, *Asian J. Org. Chem.*, 8:1626-1630 (2019).

Lim B, Baek B, Jang K, Lee NK, Lee JH, Lee Y, Kim J, Kang SW, Park J, Kim S, Kang N, Hong S, Kim D, Kim I, Hwang H, **Lee J\*** Novel turn-on fluorescent biosensors for selective detection of cellular Fe<sup>3+</sup> in lysosomes: thiophene as a selectivity-tuning handle for Fe<sup>3+</sup> sensors, *Dyes and Pigments*, 169:51-59 (2019).

Singh DK, Jang K, Kim J, **Lee J\***, Kim I\* Intramolecular Electrophilic Cyclization Approach to 6-Substituted Naphtho[2,1-*b*]benzofurans: Novel Dual-State Emissive Fluorophores with Blue Emission, *ACS Comb. Sci.* 21(5):408-416 (2019).

Lim B, Park S, Park JH, Gam J, Kim S, Yang JW, **Lee J\*** A metal-free and mild approach to 1,3,4-oxadiazol-2(3H)-ones via oxidative C-C bond cleavage using molecular oxygen, *Org. Biomol. Chem.*, 16:2105-2113 (2018).

Kwon S, Lee Y, Jung Y, Kim JH, Baek B, Lim B, Lee J, Kim I, **Lee J\*** Mitochondria-targeting indolizino[3,2-*c*]quinolines as novel class of photosensitizers for photodynamic anticancer activity, *Eur. J. Med. Chem.*, 148:116-127 (2018).

Lee HJ, Pham PC, Hyun SY, Baek B, Kim B, Kim Y, Min HY, **Lee J\***, Lee HY\* Development of a 4-aminopyrazolo[3,4-*d*]pyrimidine-based dual IGF1R/Src inhibitor as a novel anticancer agent with minimal toxicity, *Molecular Cancer*, 17(1):50 (2018).

Kwon S, Kwon DI, Jung Y, Kim JH, Lee Y, Lim B, Kim I, **Lee J\*** Indolizino[3,2-*c*]quinolines as environment-sensitive fluorescent light-up probes for targeted live cell imaging, *Sensors & Actuators: B. Chemical*, 252:340-352 (2017).

Lee J, Lee Y, Park SJ, Lee J, Kim YS, Suh YG, **Lee J\*** Discovery of highly selective and potent monoamine oxidase B inhibitors: Contribution of additional phenyl rings introduced into 2-aryl-1,3,4-oxadiazin-5(6H)-one, *Eur. J. Med. Chem.*, 130:365-378 (2017)

Alam MM, Lee SC, Jung Y, Yun HJ, Min HY, Lee HJ, Pham PC, Moon J, Kwon DI, Lim B, Suh YG, **Lee J\***, Lee HY\* Novel C6-substituted 1,3,4-oxadiazinones as potential anti-cancer agents, *Oncotarget*, 6(38):40598-610 (2015)

Lee R, Gam J, Moon J, Lee SG, Suh YG, Lee BG, **Lee J\*** A critical element of the light-induced quaternary structural changes in YtvA-LOV, *Protein Science* 24(12):1997-2007 (2015)

Park S, Kwon DI, **Lee J\*** Kim I\* When Indolizine Meets Quinoline: Diversity-Oriented Synthesis of New Polyheterocycles and Their Optical Properties, *ACS Comb. Sci.*, 17(8):459-469 (2015)

Moon J, Gam J, Lee SG, Suh YG, and **Lee J\*** Light Regulated Tetracycline Binding to the Tet Repressor, *Chem.–Eur. J.*, 20: 2508-2514 (2014)