ERZSÉBET MERNYÁK

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RESEARCH AREA

Multidrug resistance represents a significant challenge in anticancer and antimicrobial therapies; therefore, our aim is to develop novel active compounds capable of circumventing or reducing drug resistance. Our research group focuses on the structural modification of phenolic natural products (e.g., flavonoids, coumarins, steroids) to enhance their therapeutic efficacy and minimize side effects. We employ modern, preferably environmentally friendly synthetic methodologies, including microwave-assisted technologies. Additionally, we develop fluorescent dyes that enable the tracking of active compounds within biological systems and, in certain cases, allow therapeutic application (e.g., photodynamic therapy). Our multidisciplinary research integrates organic chemistry, biology, and computational chemistry methods within both national and international collaborations. Students participating in the program can actively engage in these projects, gaining valuable experience across multiple scientific disciplines.

TECHNIQUES AVAILABLE IN THE LAB

Fundamental preparative organic chemistry techniques: extraction, chromatography, and recrystallization. Organic syntheses using both conventional methods and microwave reactors. Purification of compounds utilizing advanced chromatographic techniques (HPLC). Structural characterization of newly synthesized compounds by mass spectrometry and NMR spectroscopy.

SELECTED PUBLICATIONS

Bakos, É., Ágoston, H., Ignácz, R., Hunyadi, A., Poór, M., Erostyák, J., Kele, Z., Özvegy-Laczka, C., & **Mernyák, E.** (2025). Facile Synthesis of Pyridyl Rosamines as Potential Photosensitizers. **Int J Mol Sci 26(4):** 1482.

Hlogyik, T., Bózsity, N., Börzsei, R., Kovács, B., Labos, P., Hetényi, C., Kiricsi, M., Huliák, I., Kele, Z., Poór, M., Erostyák, J., Hunyadi, A., Zupkó, I., & **Mernyák, E**. (2025). The Red Shift in Estrogen Research: An Estrogen-Receptor Targeted aza-BODIPY-Estradiol Fluorescent Conjugate. **Int J Mol Sci 26(15):** 7075.

Ignácz, R., Bózsity, N., Unger, D., Kele, Z., Zupkó, I., Hunyadi, A., Gjorgoska, M., Rižner, T. L., & **Mernyák, E.** (2025). Site-selective arylations of nature-inspired flavonoids or steroidal phenols via C-H or O-H activation. **J Enzyme Inhib Med Chem 40(1):** 2530615.

Peřina, M., Börzsei, R., Henrietta Ágoston, Hlogyik, T., Poór, M., Rigó, R., Özvegy-Laczka, C., Batta, G., Hetényi, C., Vojáčková, V., Jorda, R., & **Mernyák, E.** (2024). Synthesis and estrogenic activity of BODIPY-labeled estradiol conjugates. **Eur J Pharm Sci 199:** 106813.

Traj, P., Abdolkhaliq, A. H., Németh, A., Dajcs, S. T., Tömösi, F., Lanisnik-Rizner, T., Zupkó, I., & **Mernyák, E.** (2021). Transition metal-catalysed A-ring C-H activations and C(sp2)-C(sp2) couplings in the 13α-oestrone series and in vitro evaluation of antiproliferative properties. **J Enzyme Inhib Med Chem 36(1):** 895–902.