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RESEARCH AREA

Ecdysteroids are insect molting hormones synthesized by numerous plant species in a fairly high concentration, playing a complex defensive role against insect predators. It is acknowledged that ecdysteroids exert beneficial pharmacological effects in mammals including anabolic, antitumor, blood glucose and cholesterol lowering, antiarrhythmic, and neuroprotective effects, without any detectable hormonal activity. Investigating the complex role of ecdysteroids in the biota, our research team reported that phytoecdysteroids accumulate in the blood of animals (e.g. songbirds, bats) that consume herbivorous insects/caterpillars through the food chain and exert toxic effects on the blood-sucking parasites of these animals. Currently, we aim to elucidate the ecological role of these bioactive substances through the analysis of the ecdysteroid content of biological samples from insects and a variety of insectivorous animals (songbirds, bats, hedgehogs, etc.) using state-of-the-art analytical and preparative chromatographic methods.

TECHNIQUES AVAILABLE IN THE LAB

Extraction of natural compounds from plant and other biological matrices and their structural modification by simple chemical reactions. A wide range of separation techniques are available for the isolation, purification, and characterization of natural and semi-synthetic compounds, including analytical and preparative HPLC, supercritical fluid HPLC (SFC), flash chromatography, centrifugal partition chromatography (CPC), rotational chromatography, layer chromatography (TLC) and column chromatography. It is also possible to learn about spectroscopic methods (NMR, MS, UV-VIS) used in the structural analysis of purified compounds.

SELECTED PUBLICATIONS

Budzynski, MA., Crul, T., Himanen, SV., **Tóth, N.**, Otvos, F., Sistonen, L., Vigh, L. (2017) Chaperone co-inducer BGP-15 inhibits histone deacetylases and enhances the heat shock response through increased chromatin accessibility. *Cell Stress & Chaperone* **22(5)**: 717-728.

Martins, A., **Tóth, N.**, Ványolós, A., Béni, Z., Zupkó, I., Molnár, J., Báthori, M., Hunyadi, A. (2012) Significant activity of ecdysteroids on the resistance to doxorubicin in mammalian cancer cells expressing the human ABCB1 transporter. *J Med Chem* **55(11)**: 5034-5043.

Tóth, N., Simon, A., Toth, G., Kele, Z., Hunyadi, A., Bathori, M. (2008) 26-Hydroxylated ecdysteroids from *Silene viridiflora*. *J Nat Prod* **71(8)**: 1461-1463.

Tóth, N., Szabó, A., Kacsala, P., Héger, J., Zádor, E. (2008) 20-Hydroxyecdysone increases fiber size in a muscle-specific fashion in rat. *Phytomedicine* **15(9)**: 691-698.