TheraDrugs&Food Lab

DIPARTIMENTO DI BIOTECNOLOGIE, CHIMICA E FARMACIA

UNIVERSITÀ DI SIENA 1240

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DEPARTMENT OF BIOTECHNOLOGY, CHEMISTRY AND PHARMACY

LAB
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Research activity

Short Description of Research Activity – 1

- **Development of epigenetic and non-epigenetic modulators for the treatment of hematologic tumors:**

-HDAC6 inhibitors - Class I HDAC inhibitors

-Modulators of enzymes of the epigenetic Writers family (Demethylases and Methyltransferases)

-Proapoptotic agents with anti-autophagic properties

- **Design and synthesis of inhibitors targeting enzymes of the endocannabinoid system for the development of therapeutic agents for neurodegenerative diseases and epilepsy treatment:**

- Selective inhibitors of endocannabinoid catabolic enzymes

- Polyfunctional modulators for the endocannabinoid and histaminergic systems

- Polyfunctional modulators for the endocannabinoid system and histone deacetylases

- Polyfunctional inhibitors of specific anabolic and catabolic enzymes of the endocannabinoid system

- **Synthesis of new pharmacological tools for the treatment of rare diseases:**

-GSK3beta inhibitors for the treatment of retinal diseases

Research activity

Brief Description of Research Activity - 2

- **Design and synthesis of enzymatic inhibitors or receptor modulators for the development of new infectious agents:**

-Inhibitors of metalloproteases and serine and cysteine proteases as antiviral and antibacterial agents

-Inhibitors of enzymes involved in redox metabolism as antiparasitic agents

-Inhibitors of metalloenzymes for the treatment of helminth infections

-Modulators of receptors involved in quorum sensing as innovative strategies against bacterial resistance

- **Green chemistry methods for the development of new neurodegeneration modulators.**

Food traceability and functional foods:

-Multivariate approach for food traceability through analytical and statistical methods.

-Development of fortified foods using plant matrices obtained from biostimulated cultivation.

Images

•CEM Microwave Reactor
•Analytical and semi-preparative HPLC (Shimadzu) equipped with a diode array detector for recording analyte spectra, autosampler, fraction collector, and thermostated column oven.
•Medium-pressure purification system with pre-packed columns and fraction collector (Biotage® Selekt).
•Multiprobe NMR (Varian 300 MHz)

Applications and collaborations

- Extraction of active principles from plant matrices and quali-quantitative characterization through mono- and two-dimensional NMR.
- Several modulators of the endocannabinoid system have been developed and tested through collaboration with Hoffmann-La Roche Ltd for evaluating enzymatic activity, pharmacokinetic profiles, and X-ray crystal structures of the developed compounds. Some new compounds are currently under study through the same collaboration.
- Active collaboration with the BioAgryLab Research Laboratory of the Department of Life Sciences at the University of Siena. The collaboration allows for conducting research on the development of functional food prototypes, the use of simulated gastro-enteric digestion systems to evaluate the bioaccessibility of molecules of nutritional interest. All this can be useful for assessing the contribution of biostimulation to the development of functional foods and food fortification. In this activity, products from BioDea (https://biodea.bio/about-biodea-il-gruppo-di-agronomi/), which provides biostimulants for agriculture, have been evaluated.
- This collaboration is still ongoing, and other products and processes are under study.

For more information

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For more information

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