Cardiovascular Pharmacology and Toxicology

RESEARCHER

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LABORATORY OF EXPERIMENTAL PHARMACOLOGY AND TOXICOLOGY

Research activity

Research activities

Development and use of pharmacological and biochemical in vitro models (primary cells, cell cultures, isolated tissues/organs) for:

1.Pharmacology/safety pharmacology/cardiovascular toxicology of newly synthesized compounds, extracts, or purified compounds of natural origin.

2.Recycling and valorization of agricultural and food by-products: evaluation of protective properties against cardiovascular diseases.

Technical skills and know-how

•Cell cultures and analysis of cell death mechanisms using biochemical and biomolecular methods (flow cytometry, cellular imaging).

•Evaluation of effects on calcium ion channels (Cav1.2, Cav3.1, Cav3.2), sodium (Nav1.5), potassium (KCa1.1, Kv11.1/hERG) using the patch-clamp electrophysiological technique.

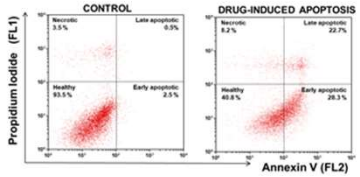
•Study of vascular effects (mechanical properties of vascular preparations).

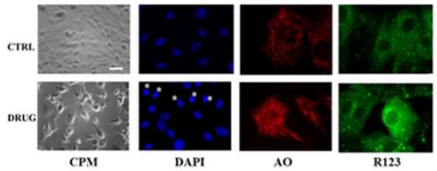
•Study of cardiac effects (inotropy, chronotropy, dromotropy, ECG, prolonged QT).

•Cell signaling.

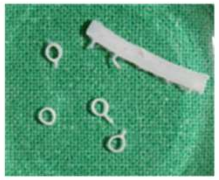
Images

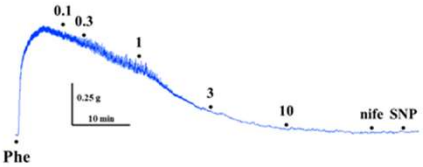
Citofluorimetry



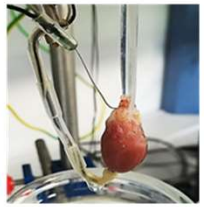


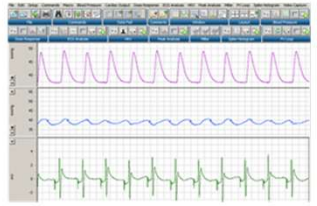
Assessment of vascular activity



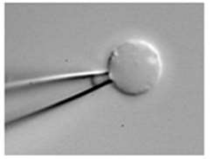


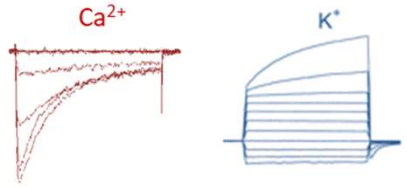
Assessment of cardiac mechanical and electrical activity





Recording ionic currents using the patch-clamp technique





Technologies and services

Instrument used/Technologies:
•Patch-clamp unit (for measuring currents across ion channels in the cell membrane).
•Langendorff isolated and perfused heart system (for assessing contraction force, coronary tone, and ECG in rat/cavy hearts).
•Computerized recording system for studying the mechanical activity of vascular preparations
•Laboratories for cell and tissue cultures (sterile hoods, incubators, cell bank, centrifuges, UV/visible and fluorescence microplate readers).
•Equipment for Western blotting and PCR.
•BD flow cytometer.
•Optical and fluorescence microscopes (IX50 Olympus; DM2500 M Leica Microsystems).
Developed services:
•"hERG channel facility" to assess the proarrhythmic potential of new compounds according to ICH-S7B guidelines in recombinant hERG (Kv11.1)-HEK293 cell lines (BPS Bioscience, San Diego, CA).
Services provided to companies:
•Evaluation of pharmacological and toxicological effects on cardiac and vascular systems of newly synthesized molecules, extracts, or purified compounds of natural origin, food matrices, and agri-food by-products.

Applications and collaborations

1. Research contract between Professor Simona Saponara and Landcare Research New Zealand Limited, Lincoln, New Zealand, "Precision Pest Eradication – pest-selective control tools. Project on «development and use of in vitro assays for the evaluation of norbormide analogs» (5/12/2022-30/09/2027)

2.Agreement between Professor Massimo Valoti and Galenica Senese Srl, Monteroni D'Arbia (SI), on the "Evaluation and calculation of Permitted Daily Exposure," (2019-2022)

3.Collaboration between Professor Simona Saponara and Azienda USL Toscana Sud-Est (Siena branch) for the analysis of adverse reactions to drugs, vaccines, medical devices (2020-present).

4.Collaboration between Professor Simona Saponara and Prof Massimo Valoti and Exolab Italia srl, L'aquila for the evaluation of the cardiovascular activity of plant and agri-food by-products exosomes (2022-present).

For more information

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