laboratory of neuronal and cardiac ion channels (Ramot)

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Lab Description

Using the powerful combination of molecular biology, biophysics, biochemistry and electrophysiology. our research aims at elucidating the structural, biophysical and physiological attributes of normal and diseased ion channels in brain and heart and whose mutations in human lead to major neurological and cardiovascular disorders like epilepsy, autism, atrial or ventricular fibrillation.

Main Research Topics

* Subunit interactions in Kv7 potassium channels: gating, thermodynamics, structure, cooperativity and implications for related neuronal and cardiac disorders.

* Targeting the voltage sensor of Kv7 and TRPV1 channels with gating-modifier molecules to treat neuropathic pain.

* Mechanisms underlying the cardiac pacemaker activity using human embryonic stem cell-derived cardiomyocytes.

* Role of Kv7.2/3 channels in hippocampal neurotransmission and tuning by Src family tyrosine kinases and tyrosine phosphatases: implications for neuronal plasticity and schizophrenia.

Available Research Services

Our “in house” capabilities and expertise include:

-Electrophysiology screening of new chemical entities (NECs) on recombinant ion channels in transfected cells.

-Electrophysiological testing of drugs on native in vitro preparation of central (cortical and hippocampal) and peripheral (DRG) neurons in primary cultures and of hippocampal neurons in brain slices.

-In vitro cardiac electrophysiology safety and profiling. Effects of potentials leads on the cardiac Herg channel. Screening of drugs on human embryonic stem cell-derived cardiomyocytes.

-In vivo testing of drugs on mice model of epilepsy (PTZ, MES).

Lab facilities

The laboratory equipment comprises two rigs of two-electrode voltage-clamp for electrophysiology in Xenopus oocyte expression system, four rigs for patch-clamp recording, one rig for brain slice electrophysiology, one confocal imaging setup (Zeiss 510 meta, shared with Prof. Nathan Dascal), which is combined with a two-electrode voltage-clamp rig that is used for dynamic FRET studies in Xenopus oocytes. A Zeiss TIRF system (Axio Observer.Z1), is mounted with a fast and sensitive EM-CCD camera (Quant-EM, photometrics). The lab has all instrumentation for molecular and biochemical experimentation, including gel electrophoresis apparatus, incubators, centrifuges, PCR machines, spectrophotometers, tissue culture facilities, shakers of growing recombinant proteins and a chromatography station GE AKTA Prime for protein purification.

Potential industries
Biotech companies, Pharmaceutical companies

Contact Information

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