

Editorial

TRP Channels as Drug Targets

The first TRP channel was identified in *Drosophila* in a screen for vision mutants. Flies with a mutant *trp* gene had a Transient Receptor Potential [1]. In other words, in response to prolonged light their photoreceptors did not show the sustained depolarization one observes in wild type animals. Mammalian homologues subsequently emerged over the next three decades and these channels have been implicated in a broad range of physiological processes including nociception [2], kidney function [3], taste [4], iron transport [5], anxiety [6], and responses to environmental irritants [7].

Unlike most families of ion channels that have been grouped together based on function, the 28 mammalian members of the Transient Receptor Potential Superfamily are subdivided into six families based on primary amino acid structures. These are the TRPCs (Classic or canonical), TRPVs (vanilloid), TRPAs (ankyrin), TRPMs (melastatin-like), TRPPs (polycystin), and TRPML (mucolipin) [8]. Two members of the TRP channel superfamily may be less than 20% identical to one another, so there is considerable diversity among family members.

Consistent with the diversity in primary structure, is the diversity observed in functional properties. The TRPs are commonly referred to as calcium permeable non-selective cation channels, but TRPM4 and TRPM5 are sodium selective channels whereas TRPV5 and TRPV6 are inwardly rectifying calcium selective channels (reviewed in [9]). TRP channels also vary in their tissue expression patterns. For example, TRPM7 is ubiquitously expressed [10] whereas the expression of TRPA1 is highly restricted [11]. Even the subcellular localization of the proteins varies with family members such as TRPML1 being hypothesized to be intracellular channels [5]. As such, few generalities can be made about TRPs.

In this issue, we attempt to cover some of the recent developments in the TRP channel arena. We start by discussing, TRPV1, the capsaicin receptor which has been the best studied of the TRP channels and the first one to be evaluated clinically. We then focus on other TRP channels that are of potential pharmaceutical interest: TRPA1, TRPM8, TRPV3, TRPC5 and TRPM5.

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Arpad Szallasi

(Guest Editor)

Departments of Pathology, Monmouth Medical Center, 300 Second Avenue
Long Branch, NJ 07740
Drexel University College of Medicine
Philadelphia
USA
E-mail: aszallasi@sbhcs.com

Magdalene M. Moran

(Co-Guest Editor)

Hydra Biosciences
790 Memorial Drive
Cambridge
MA 02139
USA
E-mail: mmoran@hydrabiosciences.com