



## HFSPO Press Release

### David Julius to receive the 2017 HFSP Nakasone Award



The Human Frontier Science Program Organization (HFSP) has announced that the 2017 HFSP Nakasone Award has been awarded to David Julius of the University of California, San Francisco for his “discovery of the molecular mechanism of thermal sensing in animals”.

The HFSP Nakasone Award was established to honor scientists who have made key breakthroughs in fields at the forefront of the life sciences. It recognizes the vision of Japan’s former Prime Minister Nakasone in the creation of the International Human Frontier Science Program. David Julius will present the HFSP Nakasone Lecture at the 17<sup>th</sup> annual meeting of HFSP awardees to be held in Lisbon, in July 2017.

David Julius identified VR1 (TRPV1) as the receptor for capsaicin, the pungent agent in chili peppers. TRPV1 belongs to the family of Transient Receptor Potential (TRP) ion channels, which function at the heart of responses to diverse sensory stimuli. These include temperature, touch, pain, osmolarity, pheromones, and taste. For decades, fundamental mechanistic questions about how pain and other somatosensory stimuli were decoded went unresolved. The identification of TRPV1 is regarded as a landmark finding that provided groundbreaking insights into mechanisms of pain sensation and sensory signaling. In this work Julius showed that TRPV1 is a calcium-permeable, non-selective cation channel that is activated not only by capsaicin, but also by heat. Moreover, he and his colleagues showed that the thermal activation threshold matched that of sensory nerve fibers. Importantly, this discovery of TRPV1 as a thermal sensor did not make use of the prior cloning of TRP channels by others, but instead relied on a functional expression cloning strategy based on capsaicin sensitivity. This discovery provided the first definitive molecular basis for the selective nature of capsaicin action, while validating the ‘specificity theory’ of nociception first suggested by Sherrington more than a 100 years ago.

Following this study, the Julius group extended their use of natural product pharmacology to identify a receptor for menthol (TRPM8), which is also activated by cold and turns out to be yet another member of the TRP ion channel family. Together, these discoveries reveal a general mechanism for thermosensation in which TRP channels function as detectors of ambient temperature spanning a wide physiological range.

Subsequent to these initial discoveries, David Julius investigated the fundamental principles and fascinating intricacies of the function of TRP channels and their roles in acute and persistent pain. This has paved the way towards elucidating atomic structures of these channels, with pharmacological implications for the development of analgesic drugs.

Through his research David Julius has been a scholar who has helped define the field of sensory reception. He is one of the most creative and respected neuroscientists of his generation with an unusually broad approach to research, ranging from biochemistry, biophysics, and therapeutics, to evolution and molecular structure.

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The HFSP Nakasone Award was established in 2010. Previous recipients are Karl Deisseroth (2010), Michael Elowitz (2011), Gina Turrigiano (2012), Stephen Quake (2013), Uri Alon (2014), James Collins (2015), and Jennifer Doudna and Emmanuelle Charpentier (2016).

The Human Frontier Science Program Organization was founded in 1989 to support international research and training at the frontier of the life sciences. It is supported by contributions from the G7 nations, together with Switzerland, Australia, India, New Zealand, Norway, Singapore, Republic of Korea and the European Union. With its collaborative research grants and postdoctoral fellowship programs, the Program has approved over 4000 awards involving more than 6700 scientists from all over the world during the 27 years of its existence. The HFSP supports research at the interface between the life sciences and the physical sciences and places special emphasis on creating opportunities for young scientists.