

VABILO NA PREDAVANJE / LECTURE INVITATION

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Z naslovom/entitled:

Physiological functions of voltage-gated proton channel Hv1

Sreda / Wednesday 5. 3. 2025 ob 13:00 uri / at 13:00

V predavalnici P2 v prvem nadstropju Fakultete za farmacijo, Aškerčeva cesta 7 / in
lecture room P2, first floor at the Faculty of Pharmacy, Aškerčeva cesta 7

Predavanje bo potekalo v angleščini

Vljudno vabljeni! / Kindly invited!

Abstract:

Voltage-gated proton channel Hv1 was discovered in our laboratory in 2006. We established Hv1 knockout mice and confirmed the function that had been thought before the molecular entity was identified; the voltage-gated proton channel regulates ROS production in phagocytes (1). We subsequently found that Hv1 regulates degranulation (2) and migration (3) of neutrophils dependent on the activity of NADPH oxidase, which mediates ROS generation. Thus, Hv1 controls neutrophil functions essential for host defense apart from sustaining ROS production for pathogen killing. Hv1 forms dimer and each protomer conducts proton contrary to other ion channels that assemble to make ion permeation pathway. The multimerization of ion channels including Hv1 is necessary for cooperative gating, but other significance remains to be addressed. Recently, we found that dimerized Hv1 undergoes glycosylation in ER, but the monomeric type does not (4). *However, the monomeric Hv1 was glycosylated when retrieved to the ER forcibly, suggesting that monomeric Hv1 escapes from glycosylation through fast export to Golgi. These findings uncover another role of Hv1 dimerization; Dimerization of Hv1 is critical for protein maturation in ER. In this seminar, we will introduce the function of Hv1 at the molecular, cellular, and whole-animal levels.*

References:

1. Okochi Y, Sasaki M, Iwasaki H, Okamura Y. Voltage-gated proton channel is expressed on phagosomes. *Biochem Biophys Res Commun*. 2009 May 1;382(2):274-9.
2. Okochi Y, Aratani Y, Adissu HA, Miyawaki N, Sasaki M, Suzuki K, Okamura Y. The voltage-gated proton channel Hv1/VSOP inhibits neutrophil granule release. *J Leukoc Biol*. 2016 Jan;99(1):7-19.
3. Okochi Y, Umemoto E, Okamura Y. Hv1/VSOP regulates neutrophil directional migration and ERK activity by tuning ROS production. *J Leukoc Biol*. 2020 May;107(5):819-831.
4. Okochi Y, Jinno Y, Okamura Y. Dimerization is required for the glycosylation of S1-S2 linker of sea urchin voltage-gated proton channel Hv1. *Biophys J*. 2024 Dec 17;123(24):4221-4232.

About the speaker:

Dr Yoshifumi Okochi is an Associate Professor in the Department of Integrative Physiology, Graduate School of Medicine, University of Osaka, Japan. He completed his doctoral studies at Nagoya University Graduate School of Science in 2005. In 2008, he joined the Department of Integrative Physiology at the University of Osaka as an assistant professor, where he was appointed associate professor in 2020. His research focuses on understanding how ion channels, in particular the voltage-gated proton channel Hv1/VSOP, regulate cellular functions. His work investigates their physiological role in immune cells and other biological systems.