Joanna Katarzyna Bujak et.al., J Clin Cell Immunol 2018, Volume 9
DOI: 10.4172/2155-9899-C1-048

Differential expression of TRPV and TRPM ion channels in the canine PBMC in response to temperature and mitogen treatment

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Movement of ions across lipid bilayer is essential in regulation of cellular functions. Transient Receptor Potential (TRP) ion channels are family of non-specific, cation permeable proteins that might tune the immune response and thus are potential targets for immunomodulation. They act as cellular sensors of temperature, pH, ROS (Radical Oxygen Species), respond to multiple phytochemicals (e.g. capsaicin) and participate in cell-environment crosstalk. TRP ion channels are expressed on immune cells however the knowledge on their role in immunity is still limited. The main aim of the study was to evaluate the expression of TRPV and TRPM members in the Canine Peripheral Blood Mononuclear Cells (cPBMC) and how the expression is affected by temperature or mitogen treatment (Concanavalin A (ConA)). *In silico* analysis revealed that canine TRP ion channels are represented by 28 members, grouped into six subfamilies. We found the highest mRNA expression of TRPM2, TRPM7 and TRPV2. PBMCs cultured in various temperatures (37 °C, 38.5 °C and 40 °C) exhibit differential expression of TRPV and TRPM. TRPV2 expression was up-regulated in response to higher temperature, on the contrary, 40 °C down-regulated expression of TRPM5. Interestingly, ConA treatment significantly reduced expression of TRP channels. Expression of TRPV1 was down-regulated also on protein level when cPBMCs were treated with ConA. The down-regulation of TRP channels expression after ConA treatment might protect the cell from activation-induced cell death. The effect of 33 °C and 41 °C as well as the effect of TRPV1 activator (capsaicin) and antagonist (capsazepine) treatment on T lymphocyte activation is currently under investigation.

Biography

Joanna Katarzyna Bujak has completed her MSc in Biology from University of Arkansas where she has worked on proteins involved in the control of hydro-mineral balance. Currently, she is a PhD student at the Faculty of Veterinary Medicine of Warsaw University of Life Sciences under the supervision of Dr. Kinga Majchrzak. Her research focuses on the role of TRP ion channels in modulation of T cells functions.

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