Heterologous expression and purification of an active human TRPV3 ion channel

The transient receptor potential vanilloid 3 (TRPV3) cation channel is widely expressed in human tissues and has been shown to be activated by mild temperatures or chemical ligands. In spite of great progress in the TRP-channel characterization, very little is known about their structure and interactions with other proteins at the atomic level. This is mainly caused by difficulties in obtaining functionally active samples of high homogeneity. Here, we report on the high-level Escherichia coli expression of the human TRPV3 channel, for which no structural information has been reported to date. We selected a suitable detergent and buffer system using analytical size-exclusion chromatography and a thermal stability assay. We demonstrate that the recombinant purified protein contains high α-helical content and migrates as dimers and tetramers on native PAGE. Furthermore, the purified channel also retains its current inducing activity, as shown by electrophysiology experiments. The ability to produce the TRPV3 channel heterologously will aid future functional and structural studies. TRPV3 and TRPV3 bind by molecular sieving (1, 2) TRPV3 and TRPV3 bind by blue native page (1, 2, 3)

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Contributors: Kol, S., Braun, C., Thiel, G., Doyle, D. A., Sundström, M., Gourdon, P., Nissen, P.
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