Ligands for stretch activated ion channels

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During tenure of the grant we have made tremendous strides in finding active ligands for the mechanosensitive channels. We developed a simple screen for the toxins based upon hypotonic swelling of GH3 clonal neurons which produced increases in internal Ca^{2+} levels that could be measured using Fura-2. Addition of active venoms would lead to a decrease in Ca^{2+} levels following swelling. Screening a variety of spider and scorpion venoms, we found that none of the scorpions tested (\approx 12) but one of the \approx 8 spiders tested was able to block volume activated Ca^{2+} uptake. The raw venom also blocked stretch activated ion channels in Xenopus oocytes, chick heart cells and GH3 cells, and whole cell mechanical currents in chick heart cells.
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Abstract:
During tenure of the grant we have made tremendous strides in finding active ligands for the mechanosensitive channels. We developed a simple screen for the toxins based upon hypotonic swelling of GH3 clonal neurons which produced increases in internal Ca\(^{2+}\) levels that could be measured using Fura-2. Addition of active venoms would lead to a decrease in Ca\(^{2+}\) levels following swelling. Screening a variety of spider and scorpion venoms, we found that none of the scorpions tested (\(\approx 12\)) but one of the \(\approx 8\) spiders tested was able to block volume activated Ca\(^{2+}\) uptake. The raw venom also blocked stretch activated ion channels in Xenopus oocytes, chick heart cells and GH3 cells, and whole cell mechanical currents in chick heart cells.

Publications arising from USARO support on this grant:


Inventions:


Degrees granted with grant support:
Y. Chen-Izu, 1994, SUNY Biophysics.

H. Hu, 1996, SUNY, Biophysics