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Taurine modulates calcium influx under normal and ototoxic conditions in isolated cochlear spiral ganglion neurons

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Abstract:
The effect of taurine on calcium homeostasis of isolated cochlear spiral ganglion neurons under normal and ototoxic conditions was investigated using fluo-3 calcium imaging. Sole application of taurine (15 mM) induced an increase in intracelluar Ca^{2+} concentration ($[Ca^{2+}]_i$), which was largely inhibited either by the application of an L-type calcium-channel blocker nifedipine or a calcium-free medium. Preincubation with 1 mM gentamicin induced an inhibition of the high K^+-evoked elevation of $[Ca^{2+}]_i$. Short-term exposure to taurine prevented this inhibition. The results suggested that taurine at this concentration was able to increase $[Ca^{2+}]_i$ mainly by calcium influx through L-type calcium channels in isolated spiral ganglion neurons and to antagonize gentamicin-induced inhibition of calcium elevation evoked by high K^+ by its calcium homeostatic effect.

Key words:
taurine, gentamicin, calcium imaging, spiral ganglion neurons, fluo-3, confocal laser scanning microscope