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Facilitation of Serotonin-Induced Signaling by the Migraine Mediator CGRP in Rat Trigeminal Neurons

Guerrero-Toro C., Timonina A., Gubert-Olive M., Giniatullin R.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

© 2016, Springer Science+Business Media New York.The monoamine neurotransmitter serotonin (5-HT) and the neuropeptide calcitonin gene-related peptide (CGRP) play an important role in migraine pathophysiology. To study potential interplay between 5-HT and CGRP in peripheral trigeminal nociception, we performed calcium imagining and patch clamp studies in rat trigeminal ganglia cells. We found that 5-HT activated Ca2+ transients in 18 % of trigeminal ganglia neurons. Exposure of trigeminal cells to CGRP significantly increased the number of 5-HT positive cells to 35 % and increased the amplitude of 5-HT-induced Ca2+ transients. Using patch clamp technique, we show that 37 % percent of trigeminal cells generated desensitizing membrane currents suggesting functional expression of 5-HT3 receptors. These responses were partially co-localized either with ATP-gated or capsaicin-sensitive neurons. Exposure to CGRP for 2 h increased the current density in the ATP-sensitive fraction of trigeminal neurons. Taken together, these data suggest that 5-HT receptor sensitization contributes to the pro-nociceptive effect of CGRP in trigeminal neurons.

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Keywords

CGRP, Migraine, Serotonin, Trigeminal neurons, TRPV1