A P2X7 receptor antagonist is able to modulate activity changes after trigeminal stimulation

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The trigeminal system plays an important part in the pathomechanism of different headaches. Activation and sensitization of this system is the main source of pain during the course of headache disorders, especially during the migraine attack. Trigeminal activation and sensitization can be modelled by the stimulation of the trigeminal ganglion. The electrical stimulation of the trigeminal ganglion causes plasma protein extravasation and activation of the second order sensory trigeminal neurones demonstrated by c-Fos immunohistochemistry.
P2X7 receptors are purinergic ionotropic receptors which are involved in chronic inflammatory and neuropathic pain mechanisms. Brilliant Blue G (BBG) is a potent antagonist of P2X7 receptors and was able to attenuate central sensitization in the caudal part of the spinal trigeminal nucleus (TNC) in the rat.
In our experiments we investigated the possible modulatory effect of the P2X7 receptor antagonist BBG on activity changes induced by the stimulation of the right trigeminal ganglion in the rat.
BBG was administered intravenously at a dose of 50 mg/bodyweight two hours prior to electrical stimulation. Stimulation was conducted under deep chloral hydrate anaesthesia with a concentric bipolar electrode at 5Hz, 0.5 mA for 5 minutes. Two hours after stimulation the animals were transcardially perfused, fixed and processed for c-Fos immunohistochemical staining.
BBG was able to attenuate the increase in the number of c-Fos immunoreactive neurones in the TNC of stimulated rats. Our results suggest that P2X7 receptors may play an important role in the activation of the trigeminal system under pathological conditions. Further evaluation of the relationship between P2X7 receptors and the trigeminal system can provide important information about the pathomechanism of headaches.
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