SEROTONIN MODULATION OF EXCITABILITY IN THE AUDITORY CORTEX FOLLOWING SENSORINEURAL HEARING LOSS

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Abstract

Sensorineural Hearing Loss - 22 million in USA

What serotonin receptor subtypes regulate intrinsic excitability in normal 2-3 week old A1 neurons? How is it different in SNHL?

Sensorotopin decreases intrinsic excitability through 5HT2 receptor, which is known to be inhibitory in cortical neurons.

Future Directions

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Methods

Whole cell voltage clamp, specific ion channel blockers can be used to test their regulation on excitability by serotonin.

Cochlear Ablation Decreases A1 Pyramidal Cell Excitability

Does serotonin decrease intrinsic excitability of normal A1 neurons by decreasing A11 firing rate, but does not alter axonal potential shape.

Conclusion

Sensorineural hearing loss affects the excitability of cortical neurons to a greater extent than axonal responses, which are preserved in Berardinelli's syndrome. These data suggest that serotonin is important in the regulation of excitability in normal A1. The loss of serotonin's inhibitory effect on the rising phase of action potentials in cochlear-ablated animals suggests that this effect may be mediated by 5HT2 receptors.

Cochlear ablation alters A11 intrinsic excitability by decreasing positive regulation of 5HT2 receptors, decreasing the rising phase and amplitude of pyramidal cell axonal potentials.

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Questions

Are these affected by early onset SNHL?

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SHT1 Receptors Modulate A1 Pyramidal Cell Excitability

Do 5HT1 receptors affect excitability in normal A1 neurons? Which serotonin receptors are affected by hearing loss?

Methods

Whole cell voltage clamp, specific ion channel blockers can be used to test their regulation on excitability by serotonin.

Cochlear Ablation Decreases A1 Pyramidal Cell Excitability

Does sensorineural hearing loss alter the intrinsic excitability of A1 pyramidal cells? Does cochlear ablation decreases the intrinsic excitability of A1 pyramidal cells and render serotonin modulation in a normal state? (P<0.05, Student’s T Test)

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