

大学院医学研究科 医学専攻 博士課程

専攻主科目名

耳鼻咽喉科学

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耳鼻咽喉科とは

- ◆ 耳・鼻・口腔咽頭・喉頭の診断から治療までをカバーする診療科
- ◆ それぞれの分野が独立した臓器に近く、また外科的治療から内科的治療までバラエティーに富む。
- ◆ ⇒ **退屈しません！**
- ◆ 聴覚・平衡覚・嗅覚・味覚（視覚以外の特殊感覚全て）ならびに複雑な喉頭運動が含まれる。
- ◆ ⇒ 従って**未開拓分野が多く**、様々な“面白い”人体現象を扱う研究が可能！

耳鼻咽喉科研究の醍醐味

- ◆ 内科・外科系一般知識には無い、**マイナー系特有の生命の神秘**を見ることが出来る。
- ◆ 内科的な極(めまい:神経耳科)から外科系的な極(頭頸部癌手術)まで極めて**バラエティに富んでおり**、メリハリが利いていて退屈しない。
- ◆ 地道な研究を10年も続ければ(世界的にも)その分野の**第一人者になってしまう**(他科では有り得ないような英文誌からの依頼原稿も来たりする)。

Purinergic signaling in cochleovestibular hair cells and afferent neurons

Ken Ito · Didier Dulon

英文依頼原稿は異例

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Abstract Purinergic signaling in the mammalian cochleovestibular hair cells and afferent neurons is reviewed. The scope includes P2 and P1 receptors in the inner hair cells (IHCs) of the cochlea, the type I spiral ganglion neurons (SGNs) that convey auditory signals from IHCs, the vestibular hair cells (VHCs) in the vestibular end organs (macula in the otolith organs and crista in the semicircular canals), and the vestibular ganglion neurons (VGNs) that transmit postural and rotatory information from VHCs. Various subtypes of P2X ionotropic receptors are expressed in IHCs as well as P2Y metabotropic receptors that mobilize intracellular calcium. Their functional roles still remain speculative, but adenosine 5'-triphosphate (ATP) could regulate the spontaneous activity of the hair cells during development and the receptor potentials of mature hair cells during sound stimulation. In SGNs, P2Y metabotropic receptors activate a nonspecific cation conductance that is permeable to large cations as NMDG⁺ and TEA⁺. Remarkably, this depolarizing nonspecific conductance in SGNs can also be activated by other metabotropic processes evoked by acetylcholine and tachykinin. The molecular nature and the role of this depolarizing channel

are unknown, but its electrophysiological properties suggest that it could lie within the transient receptor potential channel family and could regulate the firing properties of the afferent neurons. Studies on the vestibular partition (VHC and VGN) are sparse but have also shown the expression of P2X and P2Y receptors. There is still little evidence of functional P1 (adenosine) receptors in the afferent system of the inner ear.

Keywords ATP · Adenosine · Mammalian · Inner ear · Cochlea · Vestibular organ · Inner hair cell · Vestibular hair cell · Spiral ganglion · Vestibular ganglion

Introduction

Purinergic signaling is involved in various important physiological processes of the central nervous system including neurotransmission, neuromodulation, development, survival, and repair of neurons [1, 2]. Purinergic receptors are divided into P2 receptors that bind adenosine 5'-triphosphate (ATP), adenosine 5'-diphosphate (ADP), and other extracellular nucleotides, and P1 receptors that