GS01-4 Physiological role of γ1 subunit of BK_{Ca} channel in bronchial smooth muscle cells

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Asthma is a chronic disease that causes inflammation and airway narrowing by excess contraction and remodeling of airway smooth muscle (ASM). In addition to inflammation, repetitive contraction itself induces irreversible ASM remodeling. Therefore, the adequate control of smooth muscle tone is important not only for the treatment of asthma but also for the prevention of remodeling process. Large-conductance Ca^{2+}-activated K^+ (BK_{Ca}) channel is known to be an attractive target for bronchodilator, because BK_{Ca} channel hyperpolarizes membrane potentials and inhibits increase in intracellular Ca^{2+} levels and smooth muscle contraction. BK_{Ca} channel is composed of tetrameric pore-forming α subunits and accessory β subunits. Recently, novel BK_{Ca} channel subunits (BKγ) have been identified. BKγ subunits dramatically enhance voltage sensitivity of BK_{Ca} channel. However, the roles of BKγ subunits in ASM and relevance to airway diseases such as asthma are unknown. Our expression analyses and whole-cell patch clamp recordings revealed that BKγ1 is functionally expressed in mouse ASM cells. In this presentation, I focus on the role of BKγ1 in BK_{Ca} channel activity and possibility that BKγ1 is a potential therapeutic target for asthma.