

研究论文

## 烟草根皮层原生质体膜钾通道的特性研究

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**摘要** 采用膜片钳技术对烟草根皮层原生质体膜上的钾通道进行全细胞记录, 从而深入研究烟草K<sup>+</sup>的吸收机制和调控机理.结果表明,内向钾通道在膜电压低于-40 mV时,可以被K<sup>+</sup>激活.内向电流可以被钾通道的专一抑制剂TEA<sup>+</sup>抑制.动力学分析表明内向钾电流产生的K<sup>+</sup>表观解离常数(K<sub>m</sub>)≈15.2 mmol/L,类似于低亲和性钾通道.该通道具有依赖于胞外K<sup>+</sup>浓度的特性,对胞外NH<sub>4</sub><sup>+</sup>、Ca<sup>2+</sup>、Mg<sup>2+</sup>浓度变化反应敏感,内向K<sup>+</sup>电流可被不同程度地抑制.

**关键词** [膜片钳](#) [K<sup>+</sup>通道](#) [烟草](#) [全细胞](#) [吸收机制](#)

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## The Character of Inward K<sup>+</sup>-channels in the Plasma Membrane from Tobacco Root Cortex Protoplasts

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**Abstract** To understand the mechanism of K<sup>+</sup> uptake and the regulated factors, patch clamp whole-cell recording techniques were applied to isolated tobacco root cortex protoplasts. The results showed that the inward current were activated by K<sup>+</sup> into root cortex at membrane potentials more negative than -40 mV. The inward currents were strongly inhibited by the K<sup>+</sup>-channel blocker TEA<sup>+</sup>. Kinetic analysis of the inward currents yielded an apparent K<sup>+</sup> equilibrium dissociation constant (K<sub>m</sub>) of ≈15.2 mmol/L, which closely correlated to the major component of low-affinity K<sup>+</sup> uptake. The inward K<sup>+</sup>-channels were sensitive to NH<sub>4</sub><sup>+</sup> and NH<sub>4</sub><sup>+</sup> was acted on a bin-ding site external to the channel pore. The inward currents were inhibited differently by Ca<sup>2+</sup> and Mg<sup>2+</sup>. It is suggested that the inward K<sup>+</sup> channels in root cortex may function as both a physiologically important mechanism for low-affinity K<sup>+</sup> uptake and regulators of membrane potentials.

**Key words** [Patch clamp](#) [K<sup>+</sup>-channels](#) [Tobacco](#) [Whole cell](#) [Uptake](#)

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