

Molecular Architecture and Function of Tight Junctions

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Abstract

Tight junctions, also called zonula occludens, are supramolecular cell–cell adhesion complexes crucial for the architecture of epithelial tissues and selective gates that regulate the paracellular diffusion of ions and solutes. These tight connections prevent the intermixing of apical and basolateral membrane components by generating intramembrane diffusion barriers. Tight junction complexes of adjacent cells also create paracellular channels because of how closely they are spaced, which enables the selective diffusion of ions and solutes through the extracellular environment. Tight junctions are also connected to various cell behaviors and functions, such as controlling cell growth and differentiation, through the transmission of information to the cytoskeleton, nucleus, and different cell adhesion complexes. In addition to inherent genetic changes, recent studies have shown that bacterial toxins, cytokines, hormones, and drugs modify tight junction protein complexes, thus affecting their cellular functions. Recent studies have broadened our understanding of tight junction molecular

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