

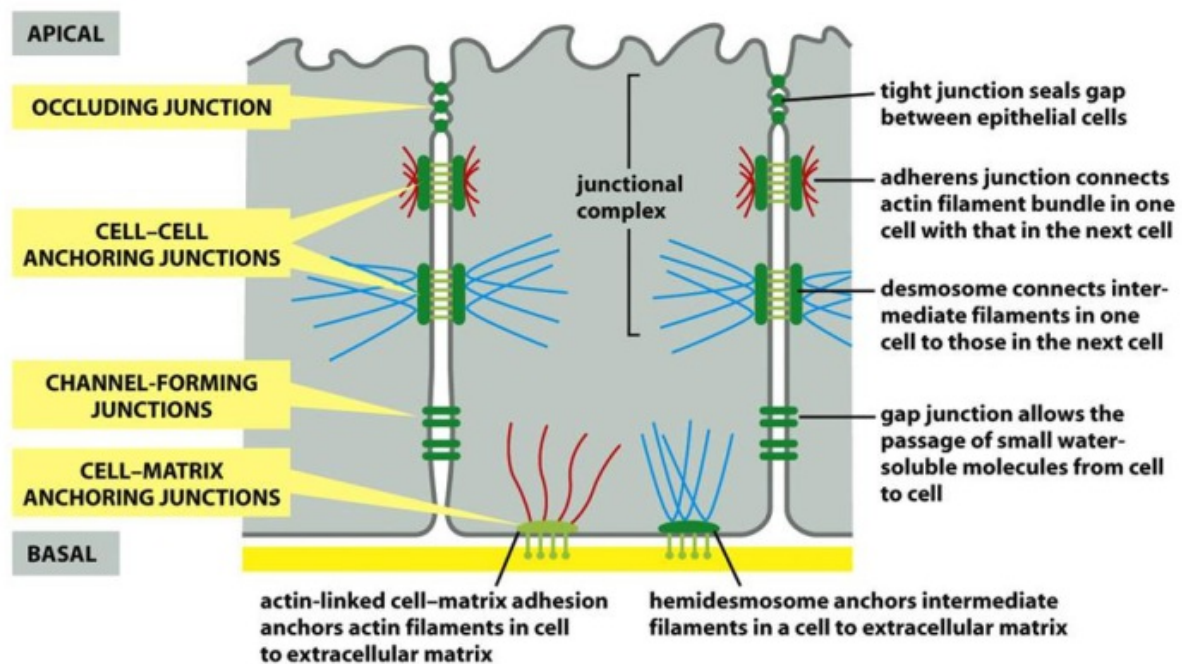
18. Integrating cells in Tissues 细胞连接，细胞间桥

Four major types of tissues: Epithelial tissue, Connective tissues, Neuron tissue, Muscle tissue.

Cell junction and adhesion are very important for multicellular organisms. It allow cells to aggregate into distinct tissues and bidirectional communication between interior and exterior of cells.

I. Overview of cell-cell and cell-ECM junction and adhesion.

Here are four major types of junctions: anchoring (锚定) junctions, occluding junction (紧密连接), channel-forming junctions and signal relaying junctions.



II. Caderins(钙粘素) and cell-cell adhesion

2.1 Cadherins family

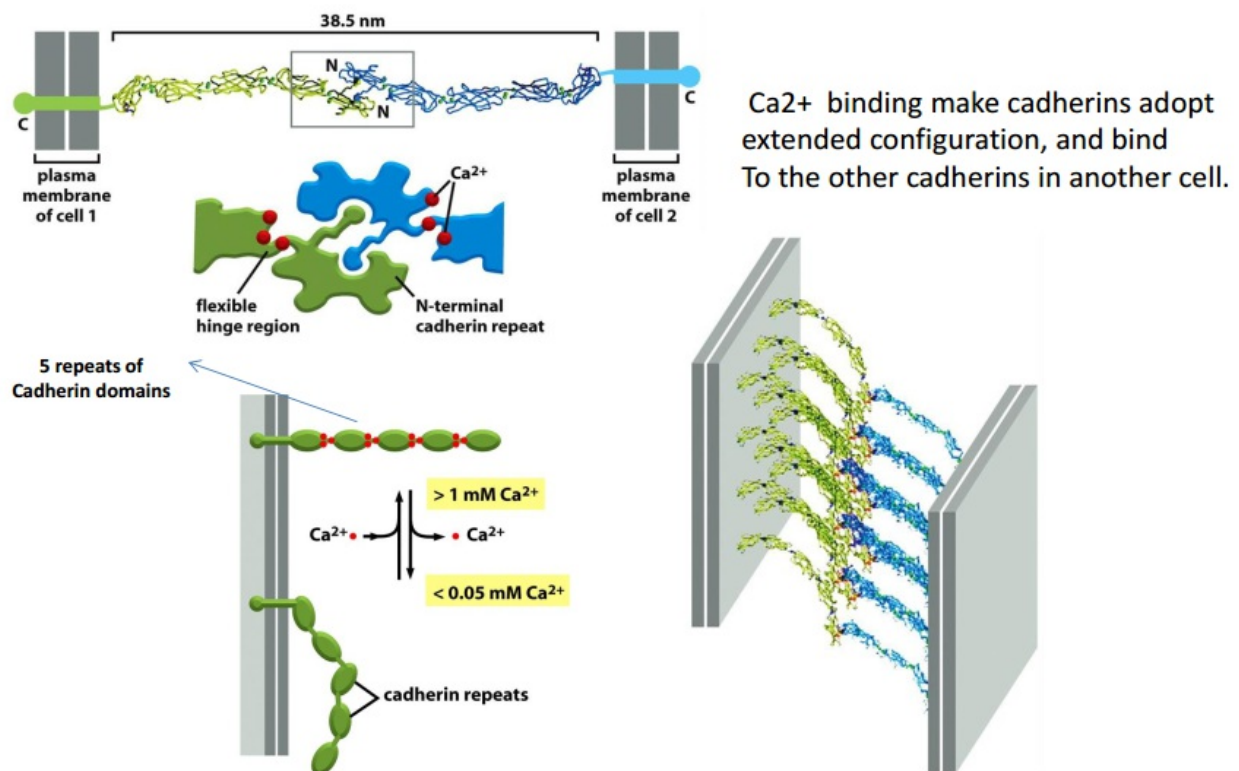
Derived from ("Ca²⁺" + "adherin"), meaning Ca²⁺-independent. So EDTA/trypsin are

use to dissociate cells from tissue, EDTA can chelate Ca^{2+} to deactivate cadherins. But plants, fungi, bacteria and archaea have no cadherins. Here are over 180 family members in humans.

2.2 homophilic binding for cadherins

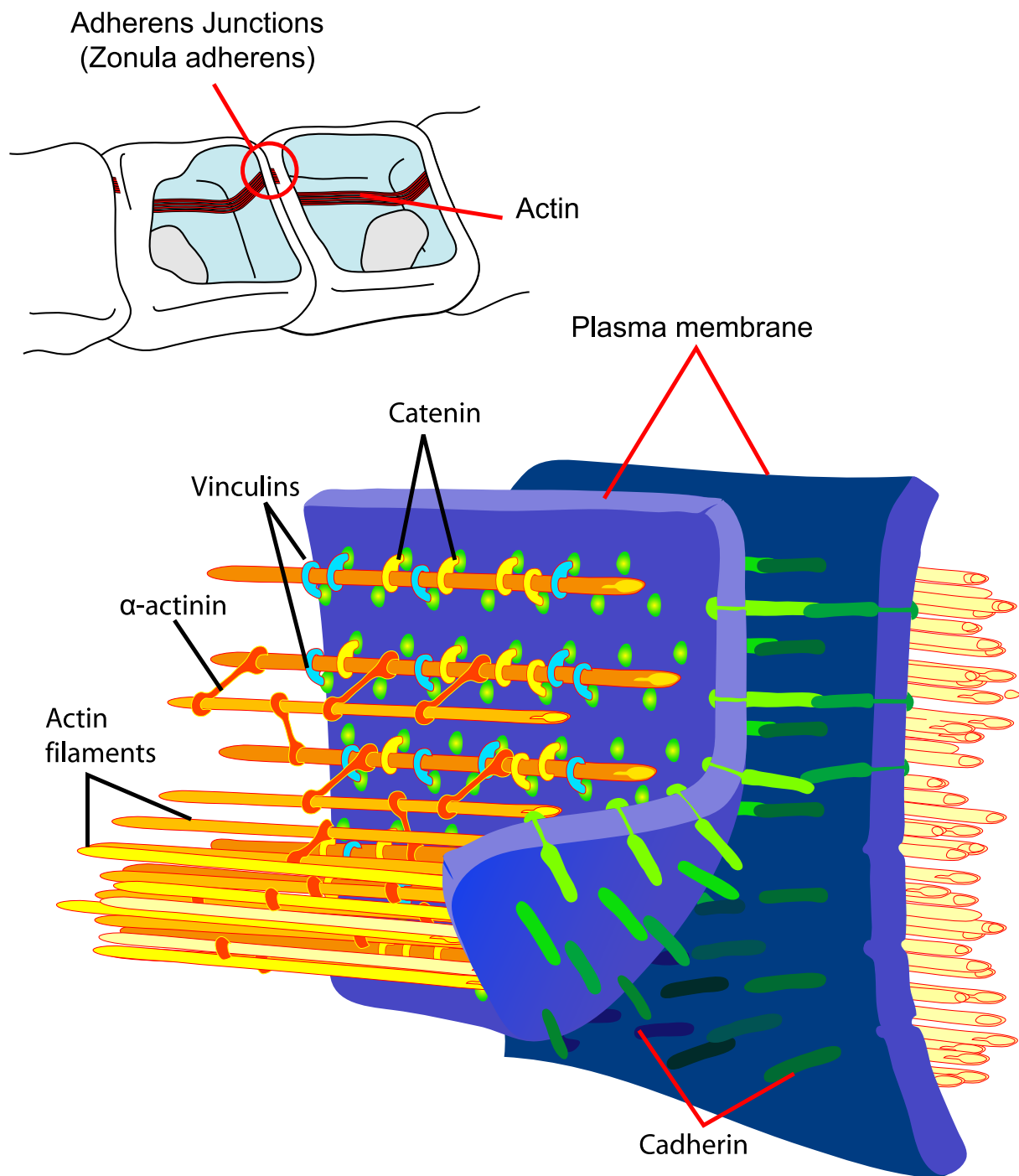
The same type of cadherin binds to the same type cadherin.

Ca^{2+} binding make cadherins adopt extended configuration, and bind to the other cadherins in another cell.



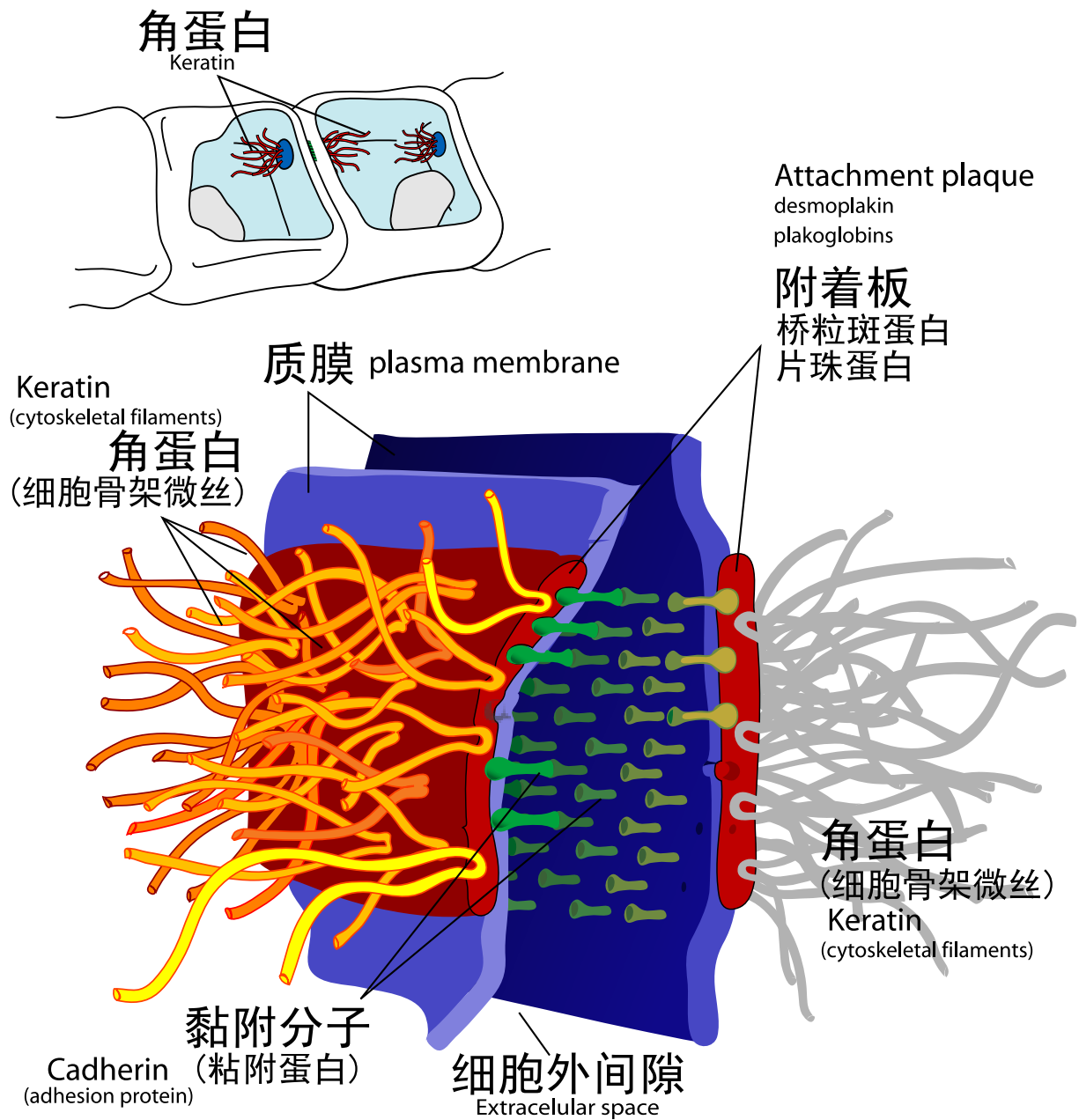
2.3 Adherens junctions (粘着小带)

Beta-Catenin link classical cadherins to the actin cytoskeleton in adherens junction. So, myosin motor can cause contraction on the adhesion belt to form epithelial tube.



2.4 desmosome junctions 桥粒、胞桥小体

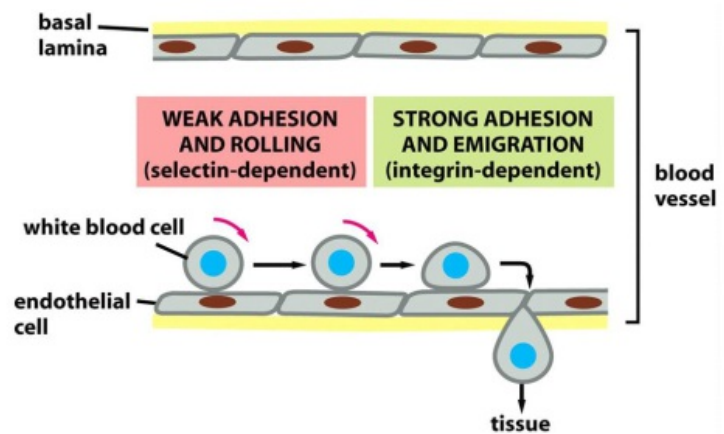
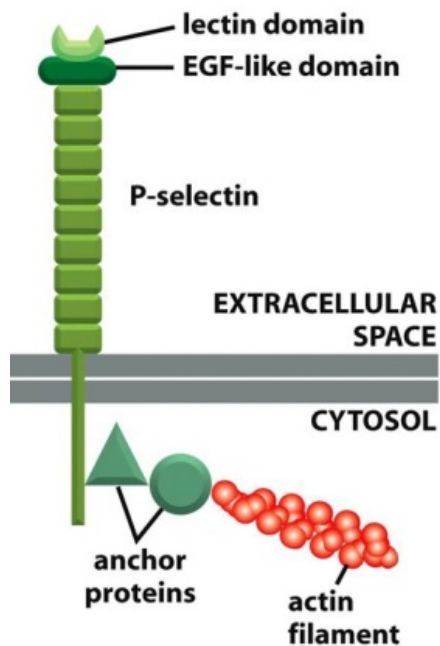
Cadherins links to intermediate filaments, which given cell mechanical strength.
Desmosome junctions are plentiful in epithelium, but not found in *Drosophila*.



2.5 selectins in blood cells adhesion

Blood cells can transiently adhere, means bind to lectins in Ca^{2+} -independent. At least 3 types for different selection.

The structure and functions for selectins



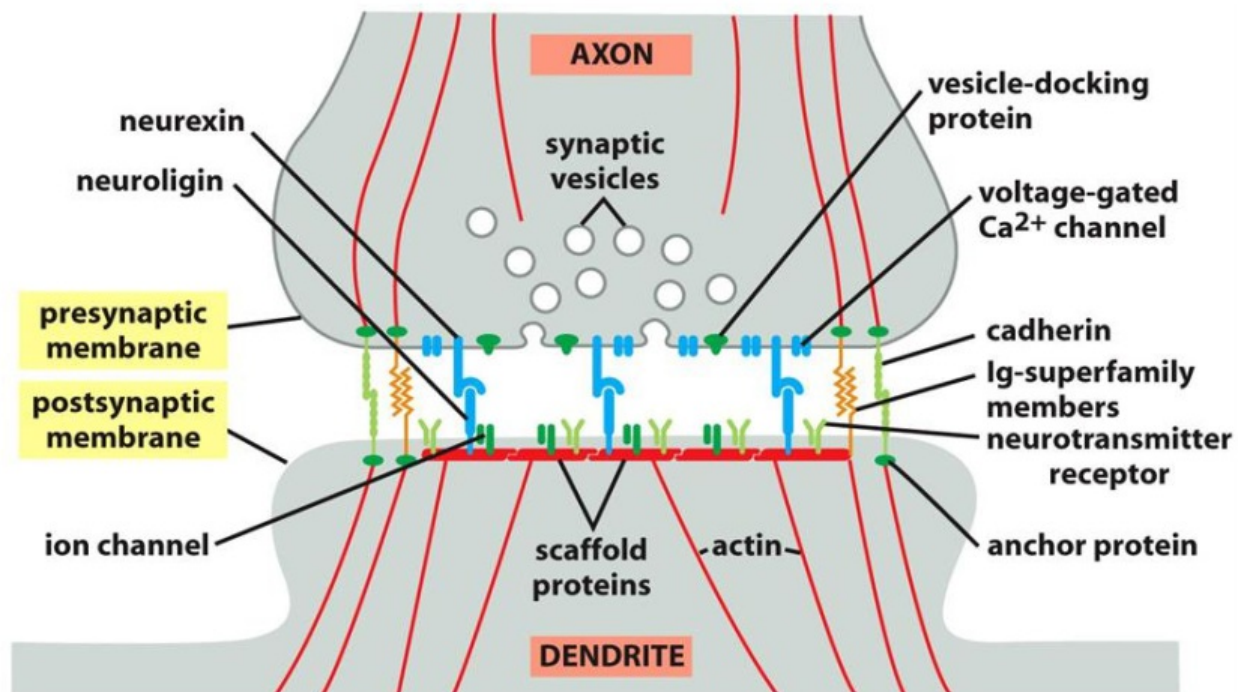
Selectins binding is weak, they collaborate with Integrin to cause emigration of white blood cells To sites of action.

2.6 Immunoglobulin proteins mediate Ca^{2+} -independent adhesion

Bind to integrin.

Many types of adhesion can form the synapse.

- Many types of adhesion molecules act together to create a synapse



III. Integrins(整联蛋白) in cell-ECM adhesion

Integrins are transmembrane protein composed of alpha- and beta- subunits, which can bind to extracellular matrix proteins. Because integrins play important role in regulating cellular function, defects in integrins signaling cause many genetic diseases.

