

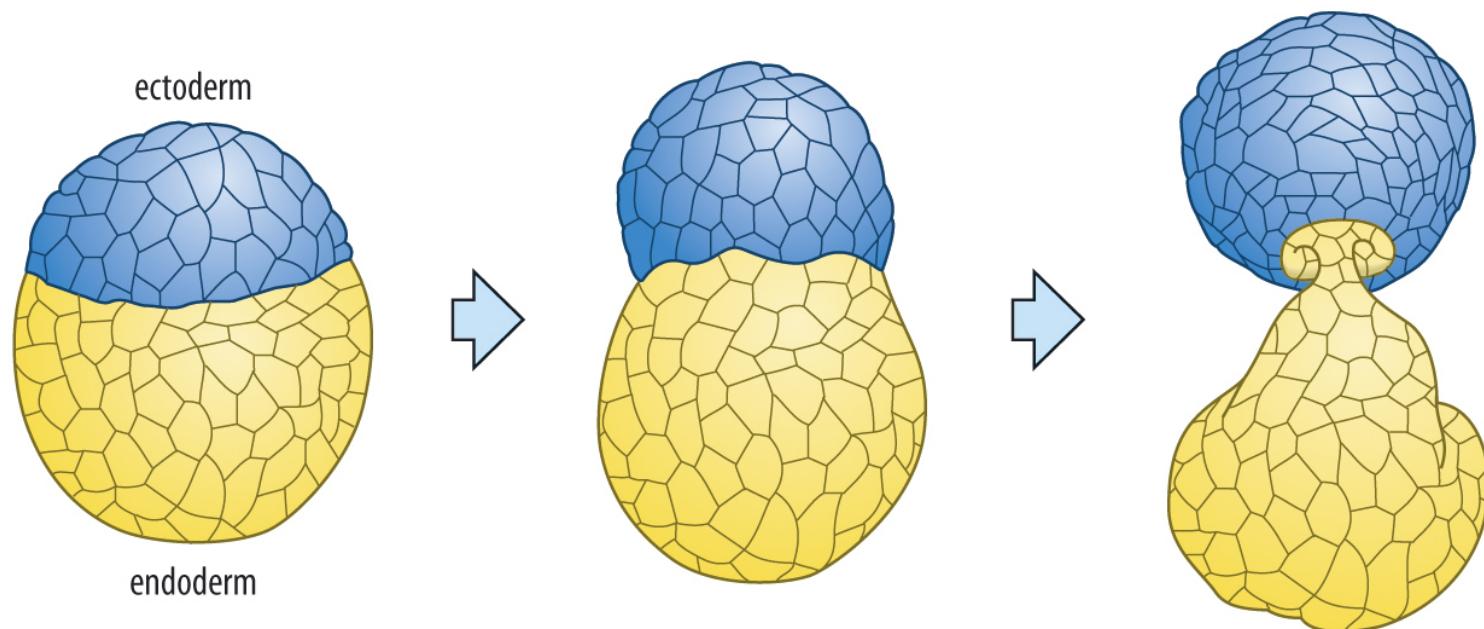
Model organisms and developmental biology

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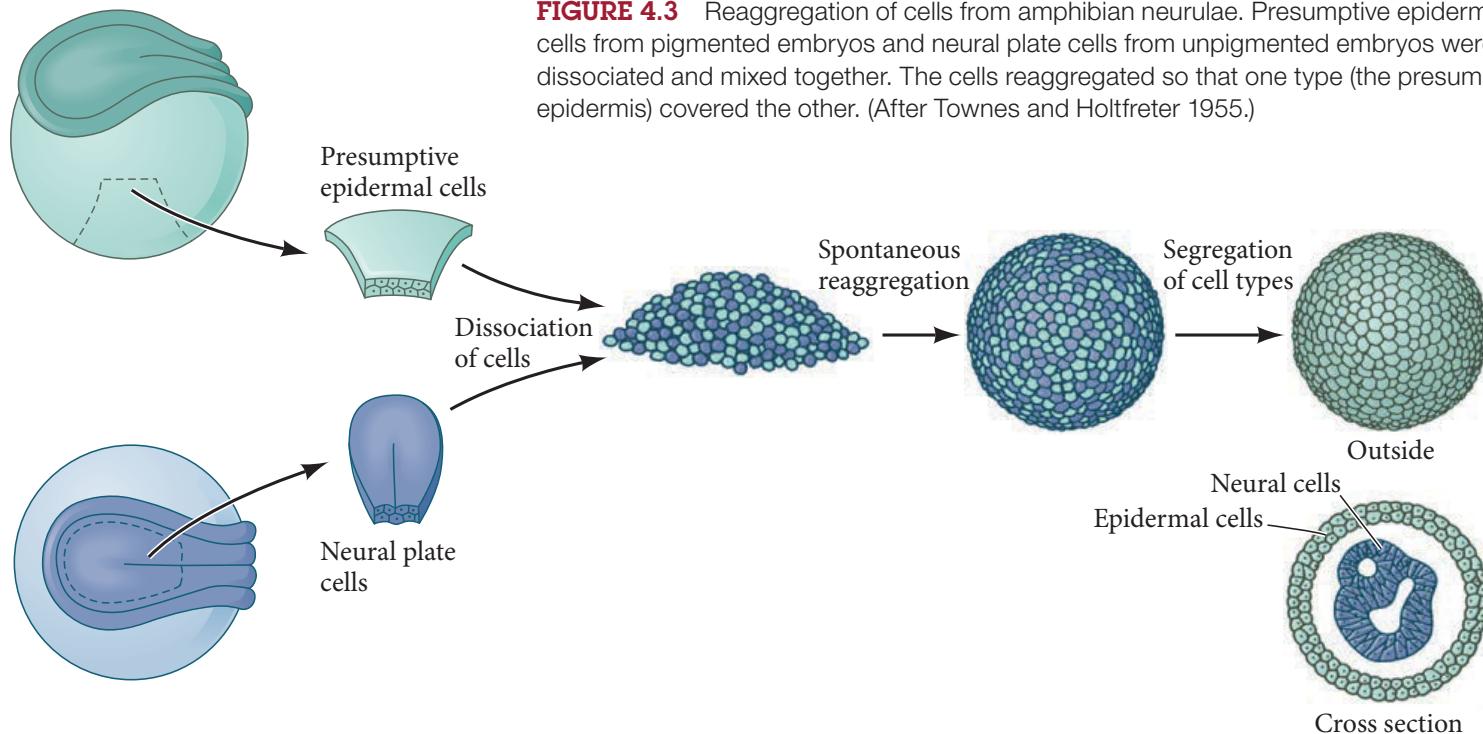
zhonghb@sustc.edu.cn

Cell adhesion

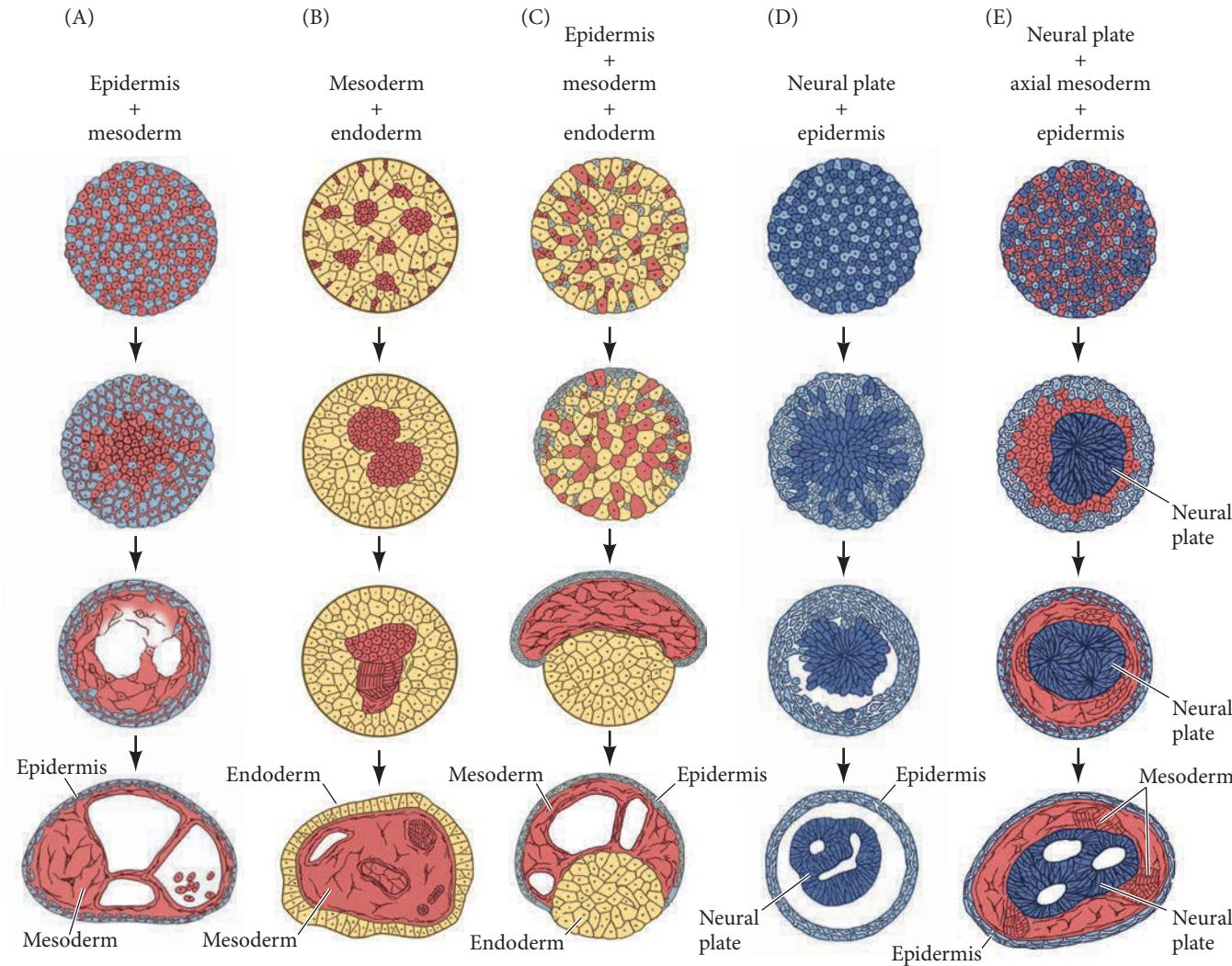
Separation of embryonic tissues with different adhesive properties



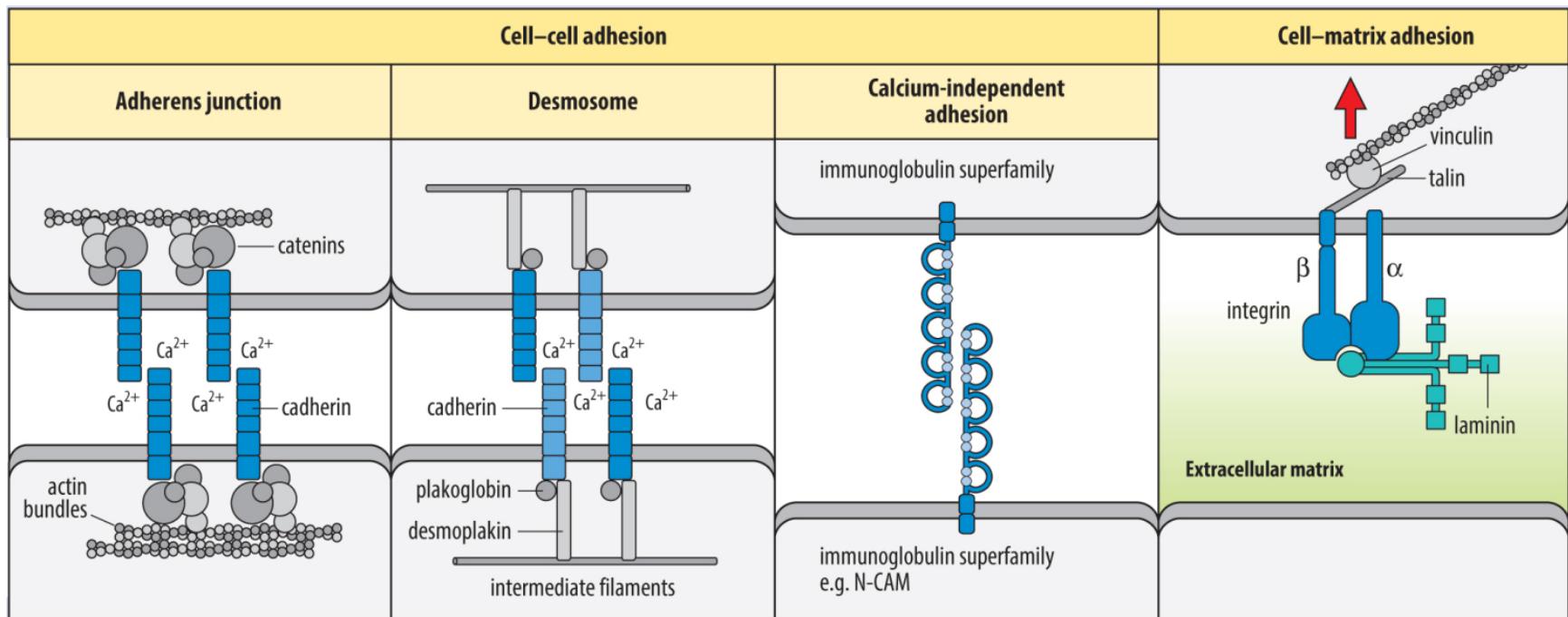
Sorting out of different cell types



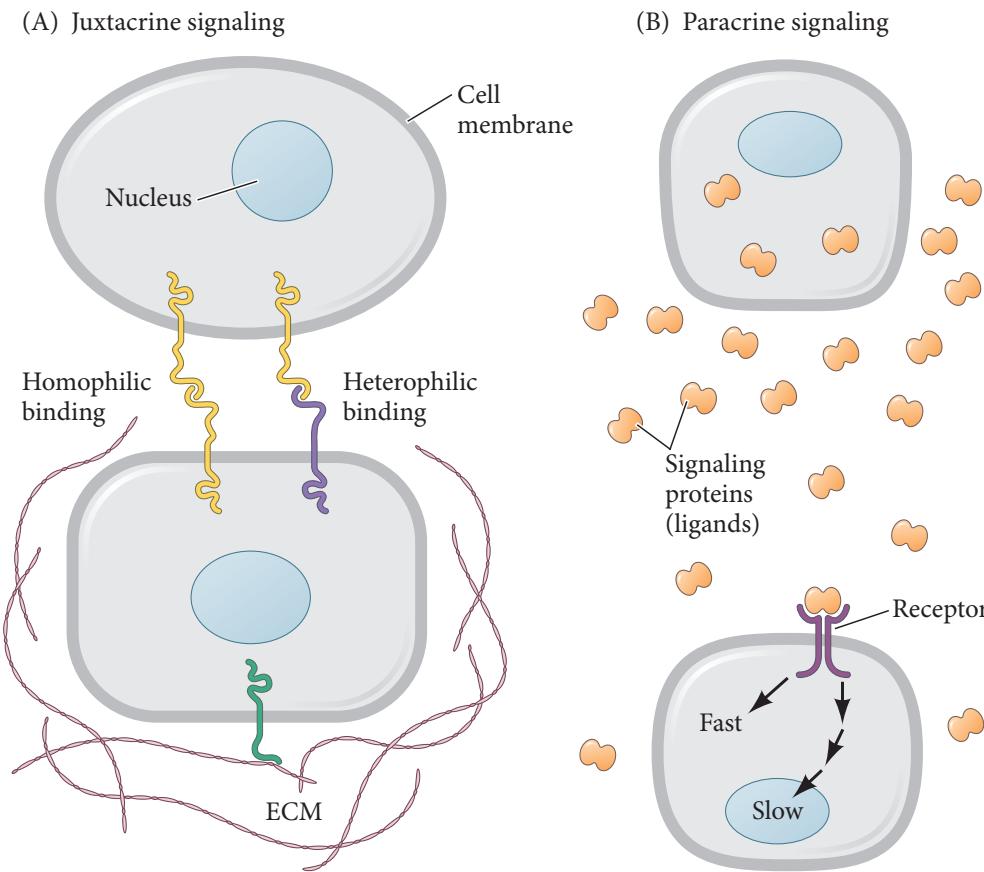
Sorting out of different cell types



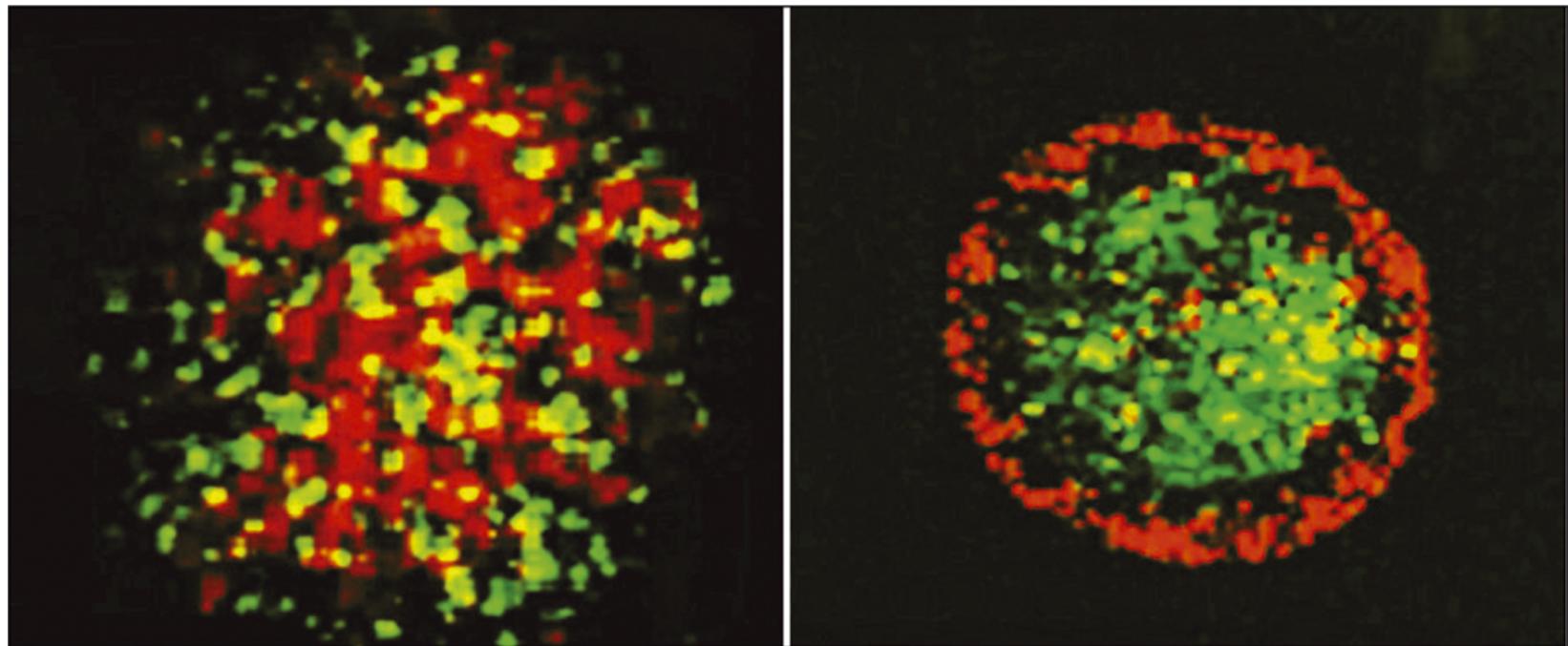
Cell adhesion molecules and cell junctions

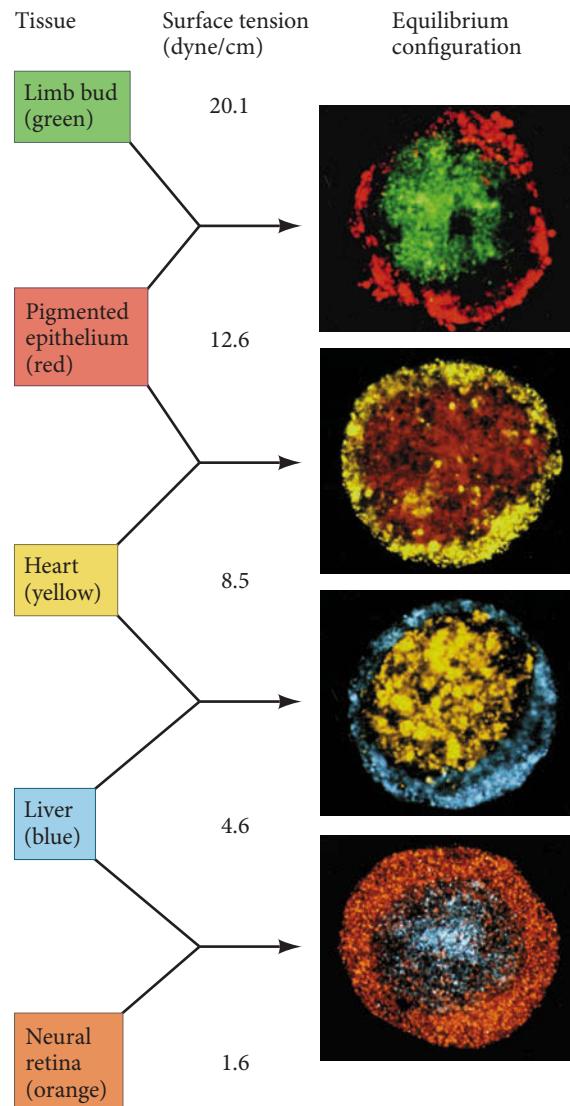
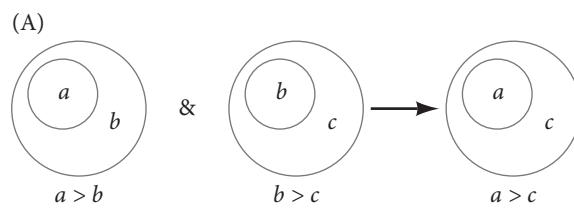


Local and long-range modes of cell-to-cell communication

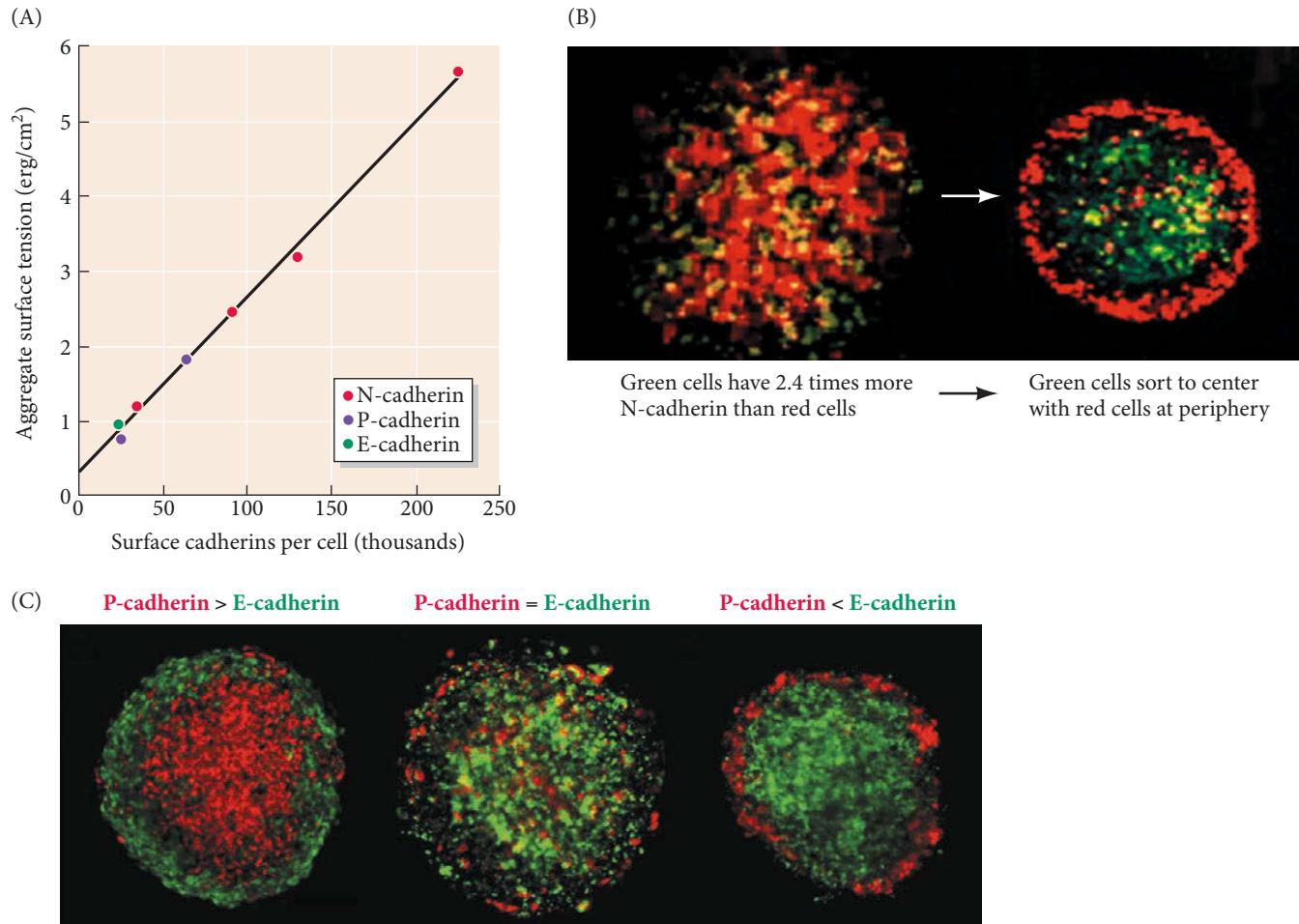


Sorting out of cells carrying different amounts of adhesion molecules on their surfaces

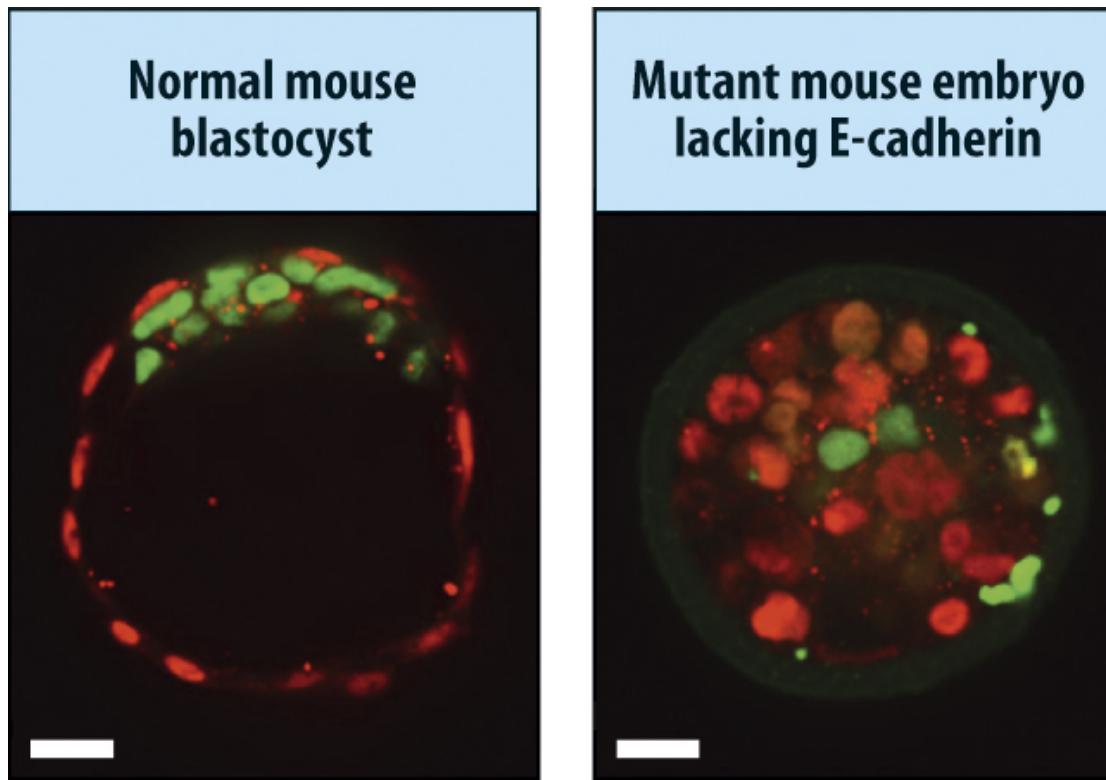




Quantity and cohesion



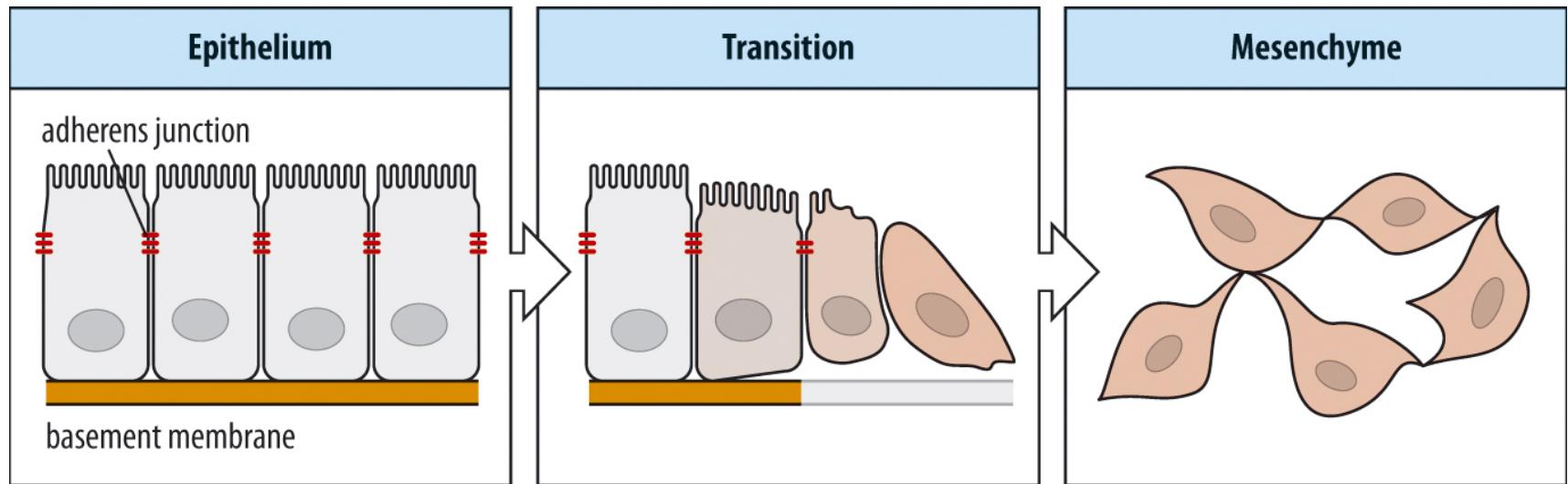
Mouse embryos do not develop into a blastocyst without E-cadherin



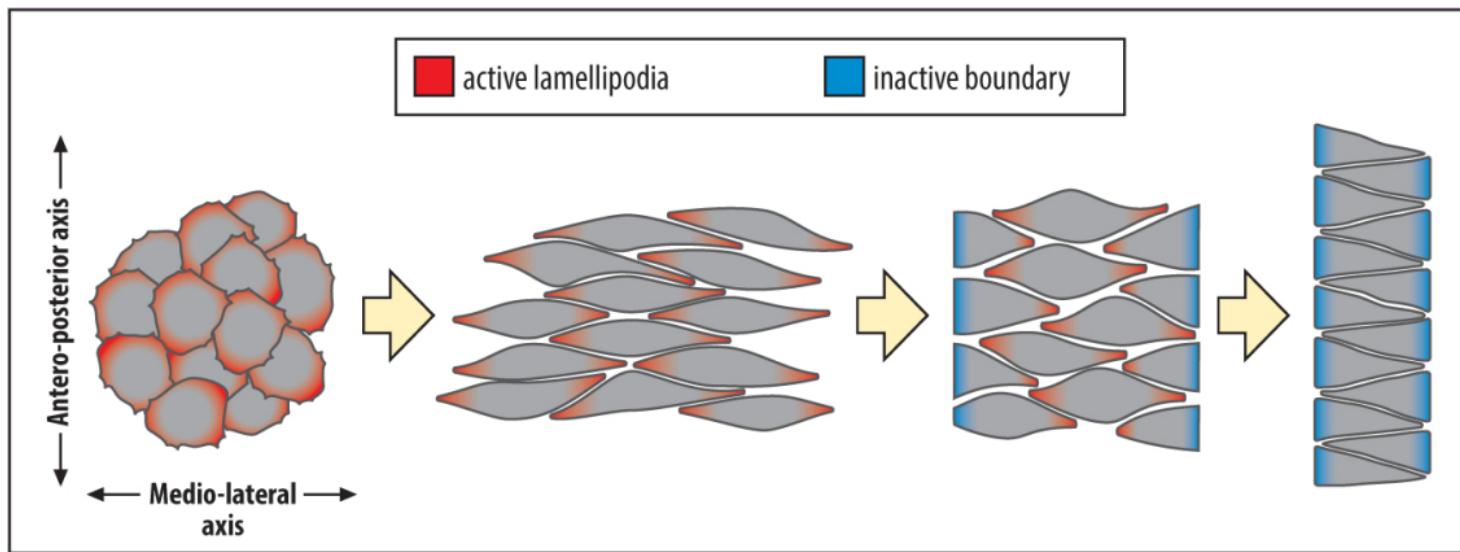
EMT and MTE

- **EMT**, epithelial-to-mesenchymal transition
- **MET**, mesenchyme-to-epithelium transition
- **Mesenchyme** describes loose connective tissue, usually of mesodermal origin, whose cells are capable of migration; some epithelia of ectodermal origin, such as the neural crest, undergo an epithelial to mesenchymal transition.

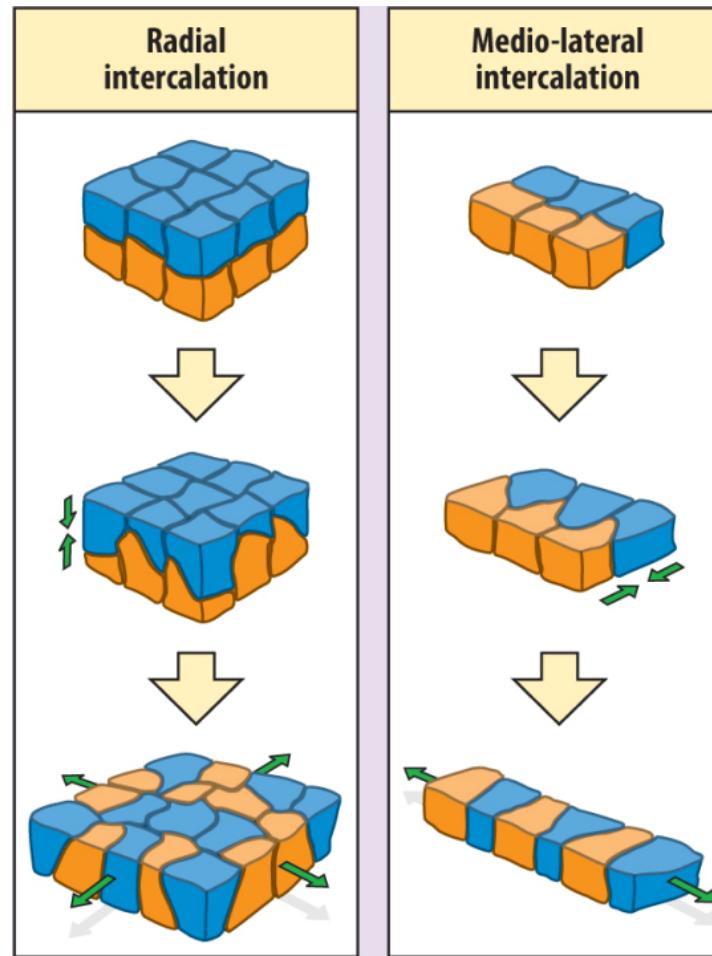
Epithelial-to-mesenchymal transition



Convergent extension

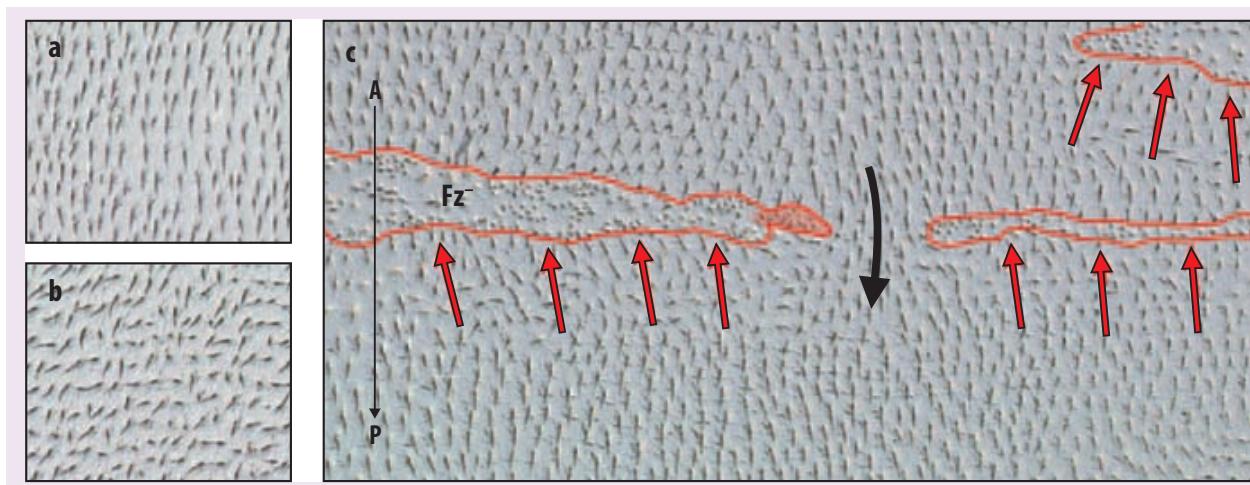


Intercalation

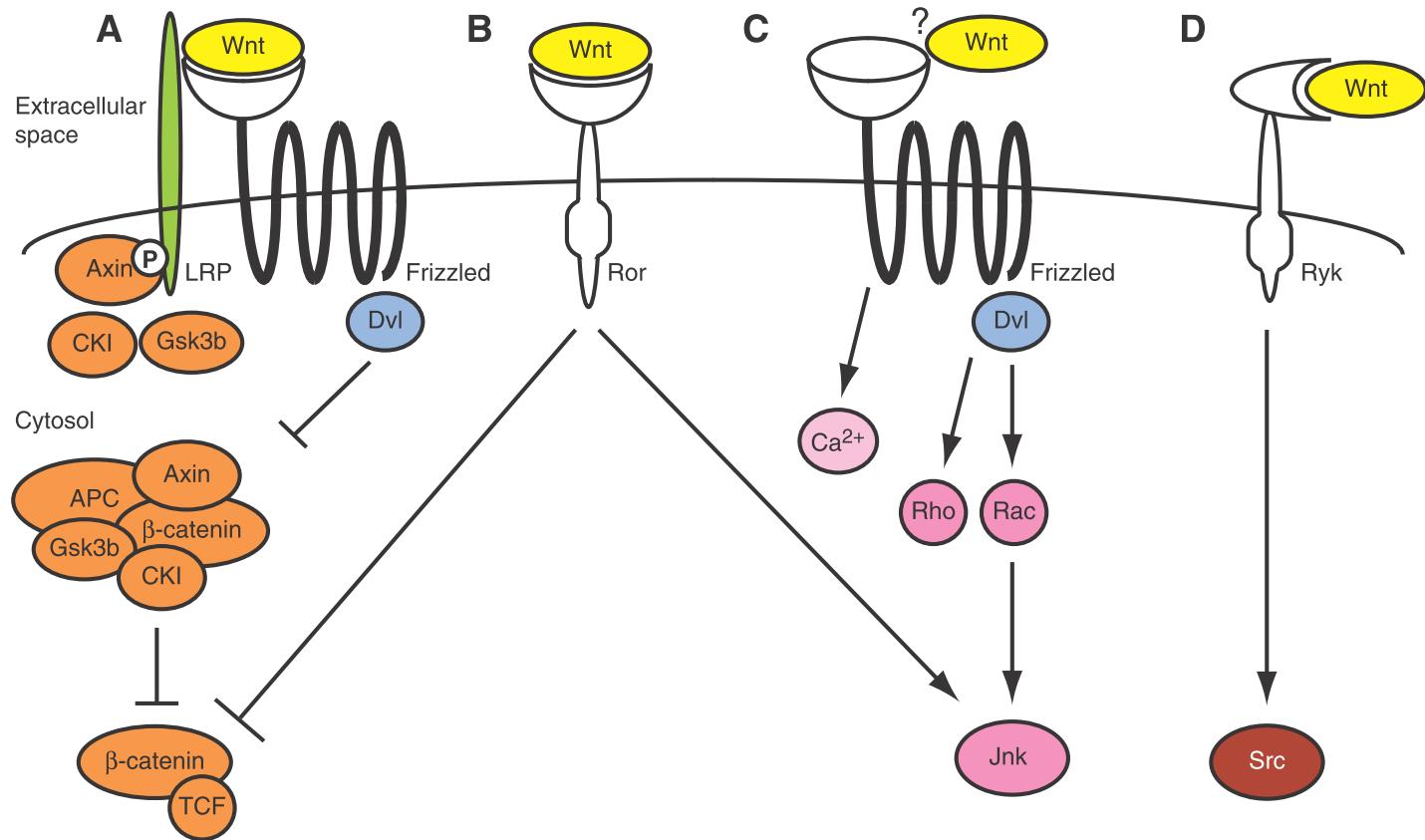


Planar cell polarity (PCP)

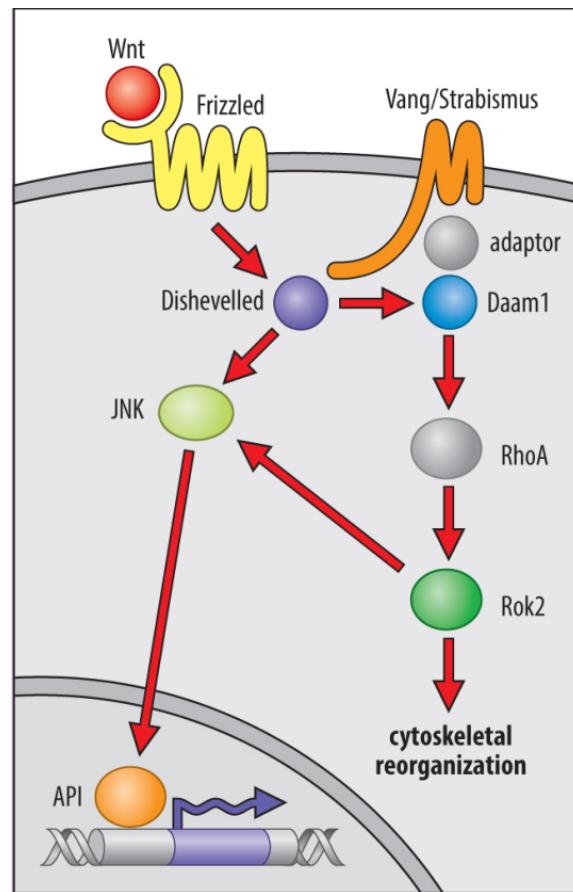
- **Planar cell polarity** is the situation in which cells are polarized in the plane of the tissue, as in the epidermis of insect wings, in which wing hairs all point in the same direction.



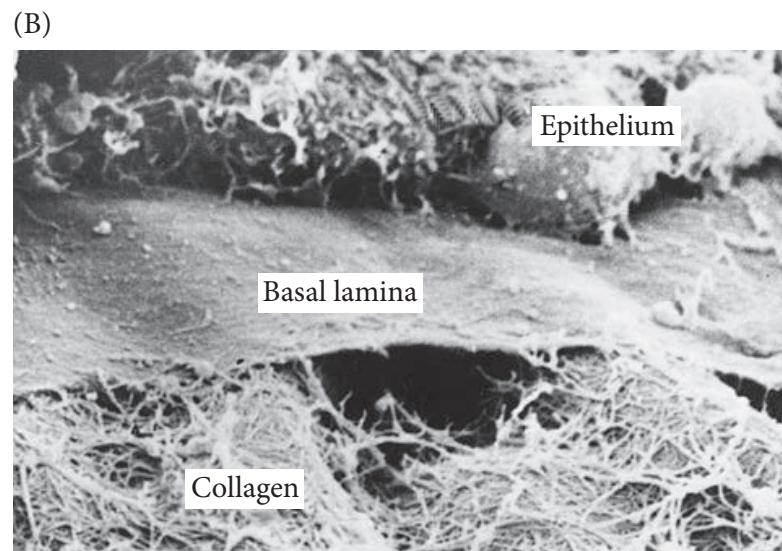
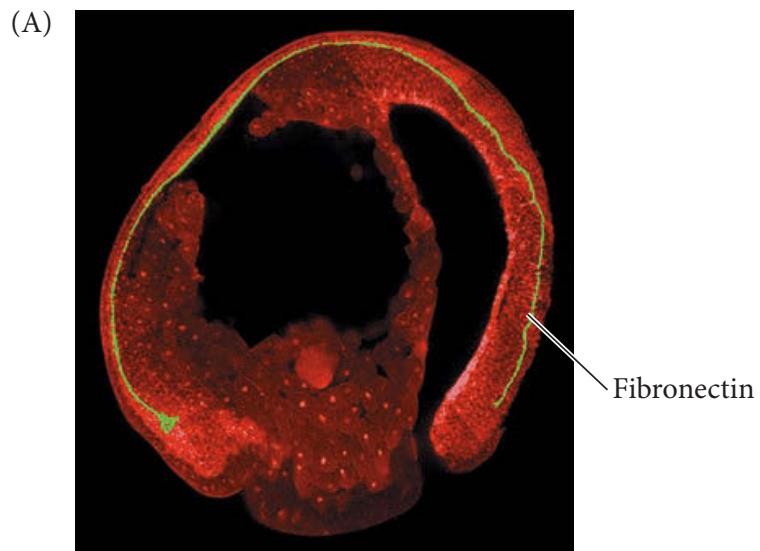
Wnt pathway



Non-canonical Wnt pathway In PCP

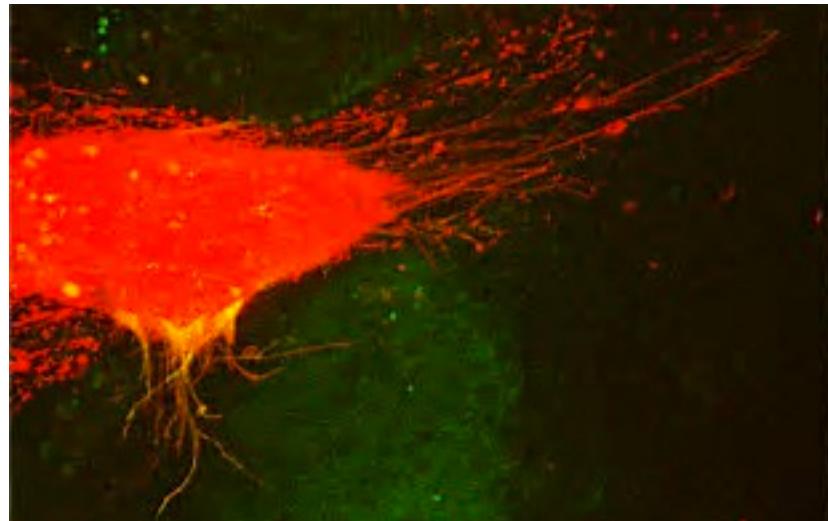


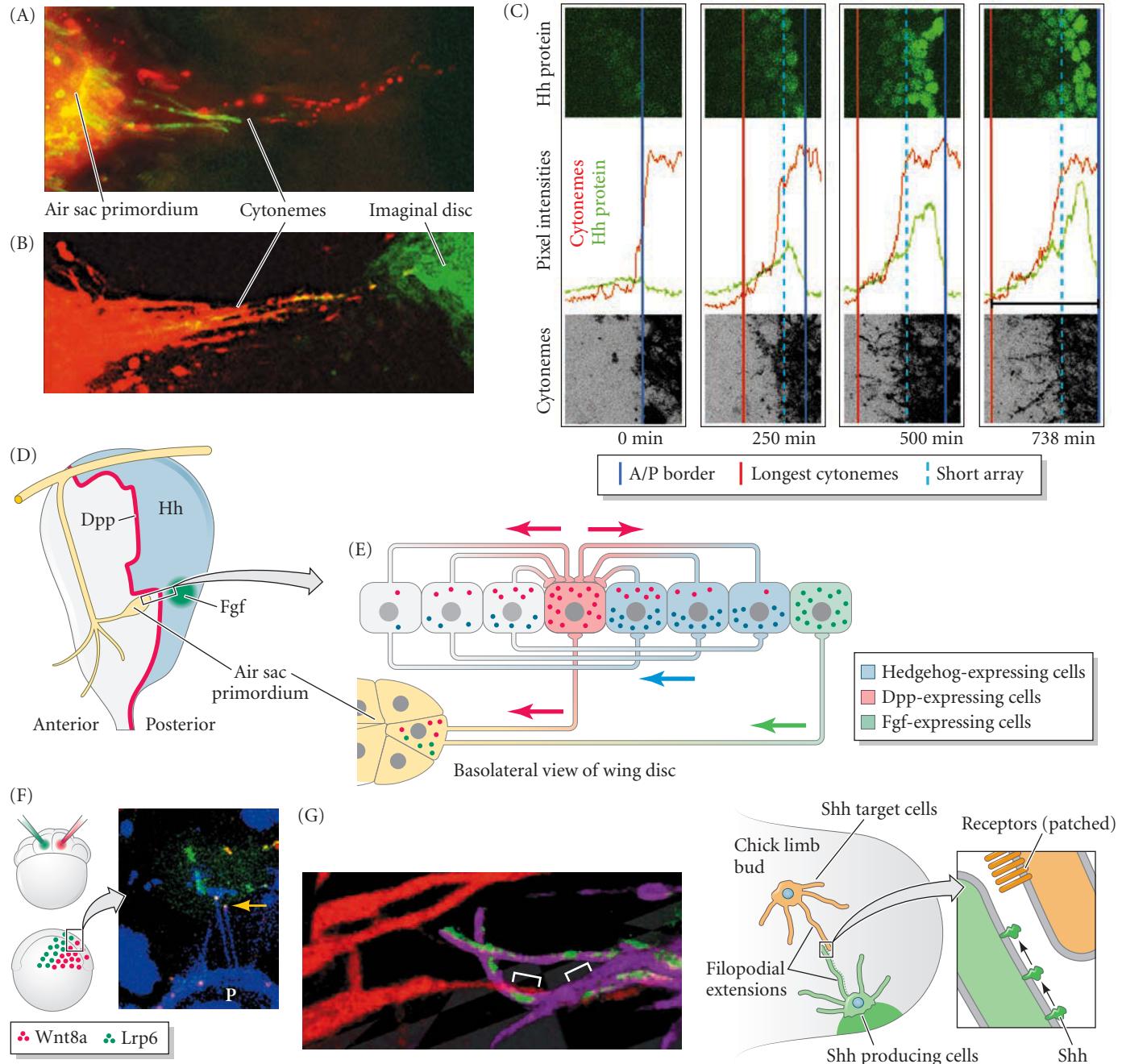
The extracellular matrix as a source of developmental signals



The filopodial cytoneme

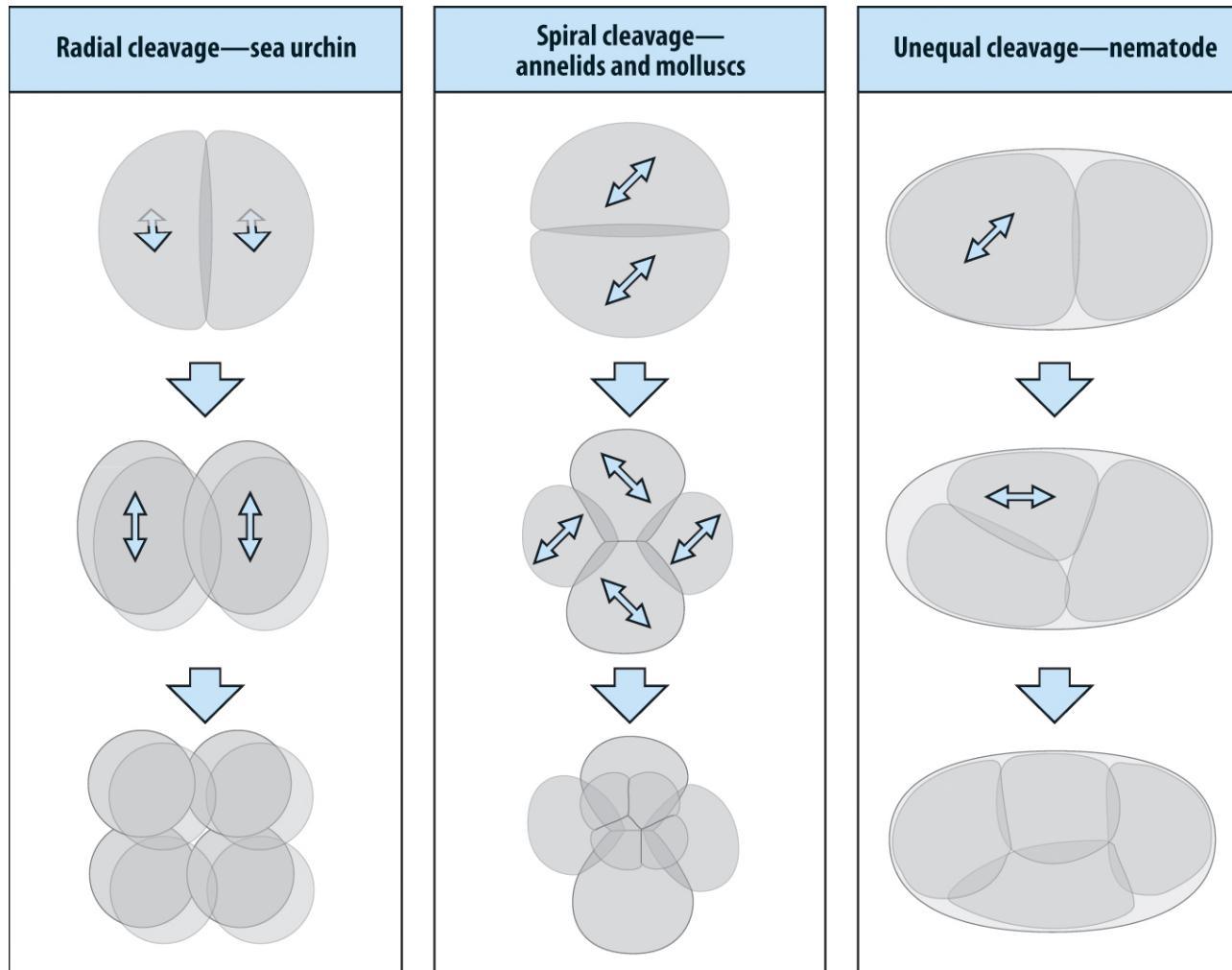
- There is now significant evidence to support the existence of specialized filopodial projections called **cytonemes**, which stretch out remarkable distances (more than 100 μm) from either the target cells or the signal-producing cells, like long membrane conduits connecting the two types of cells.



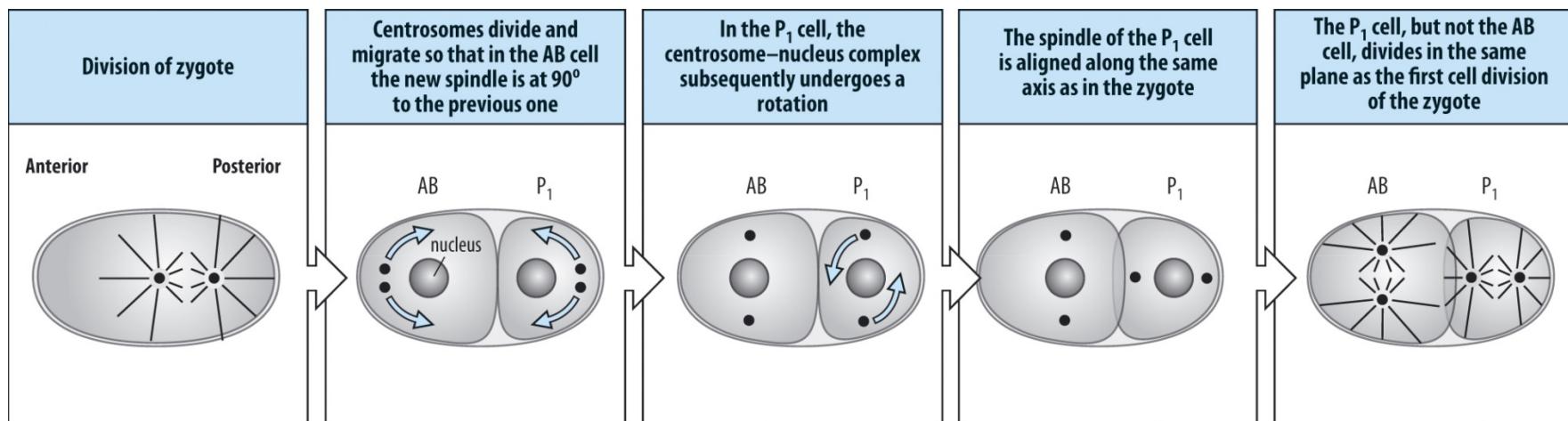


Cleavage

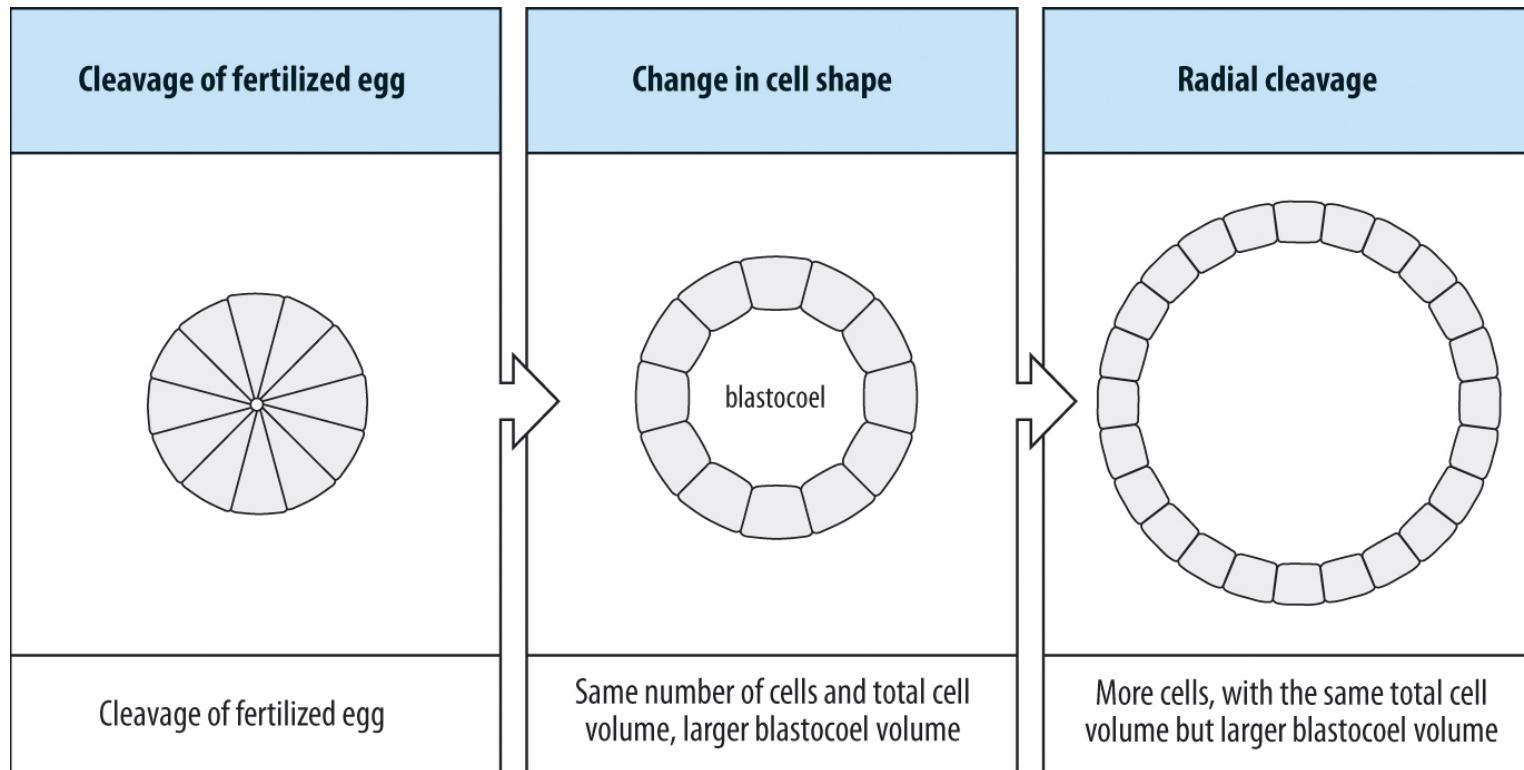
Different patterns of early cleavage are found



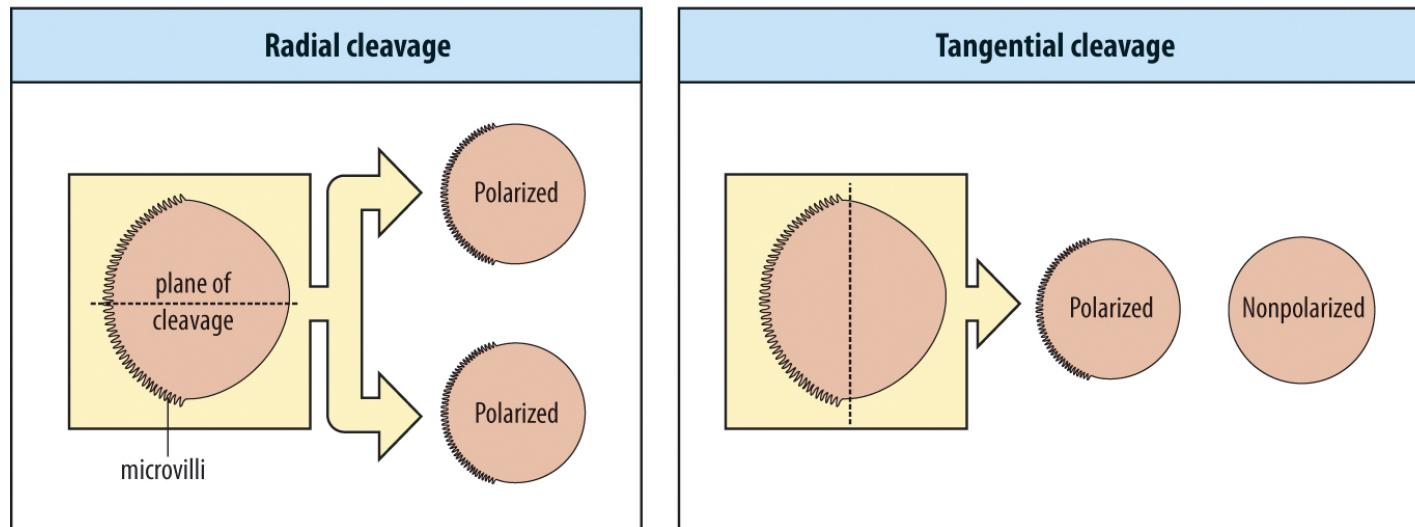
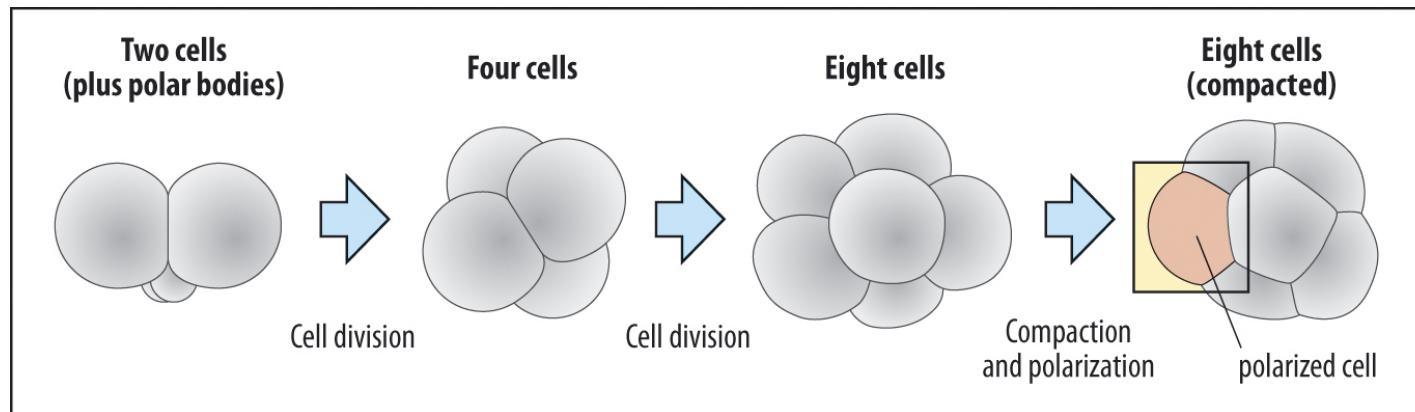
Planes of cleavage are determined by the behavior of the centrosomes



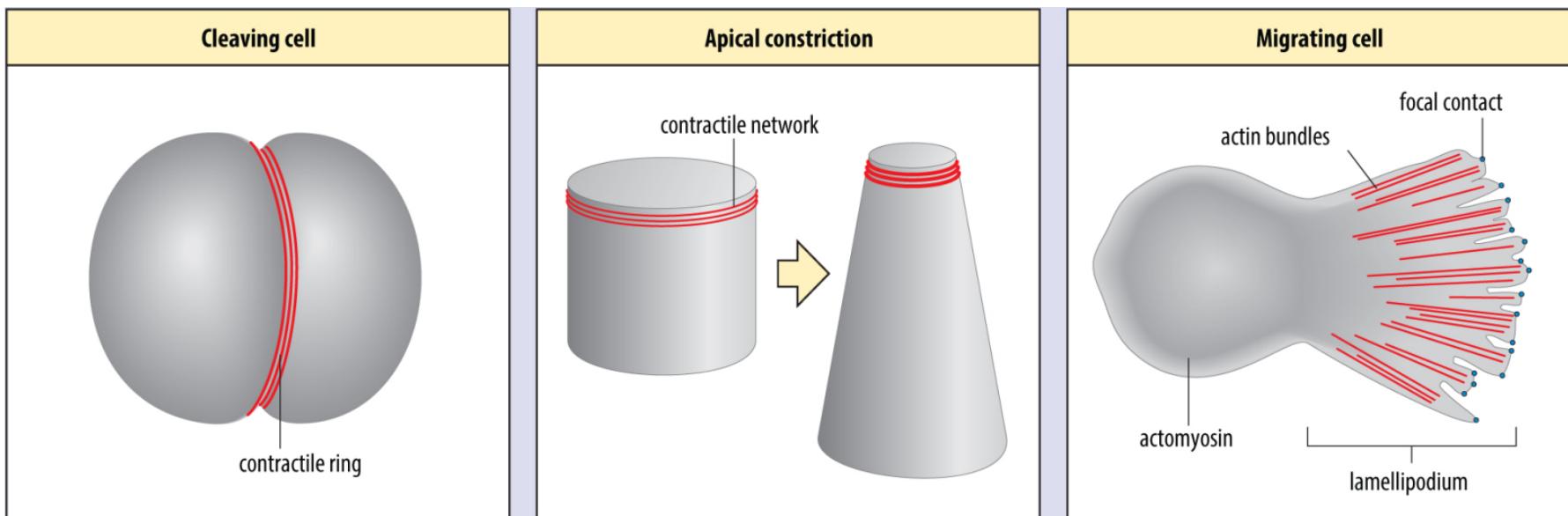
Specifically oriented cell divisions convert a small ball of cells into a hollow spherical blastula



Polarization of cells during cleavage of the mouse embryo

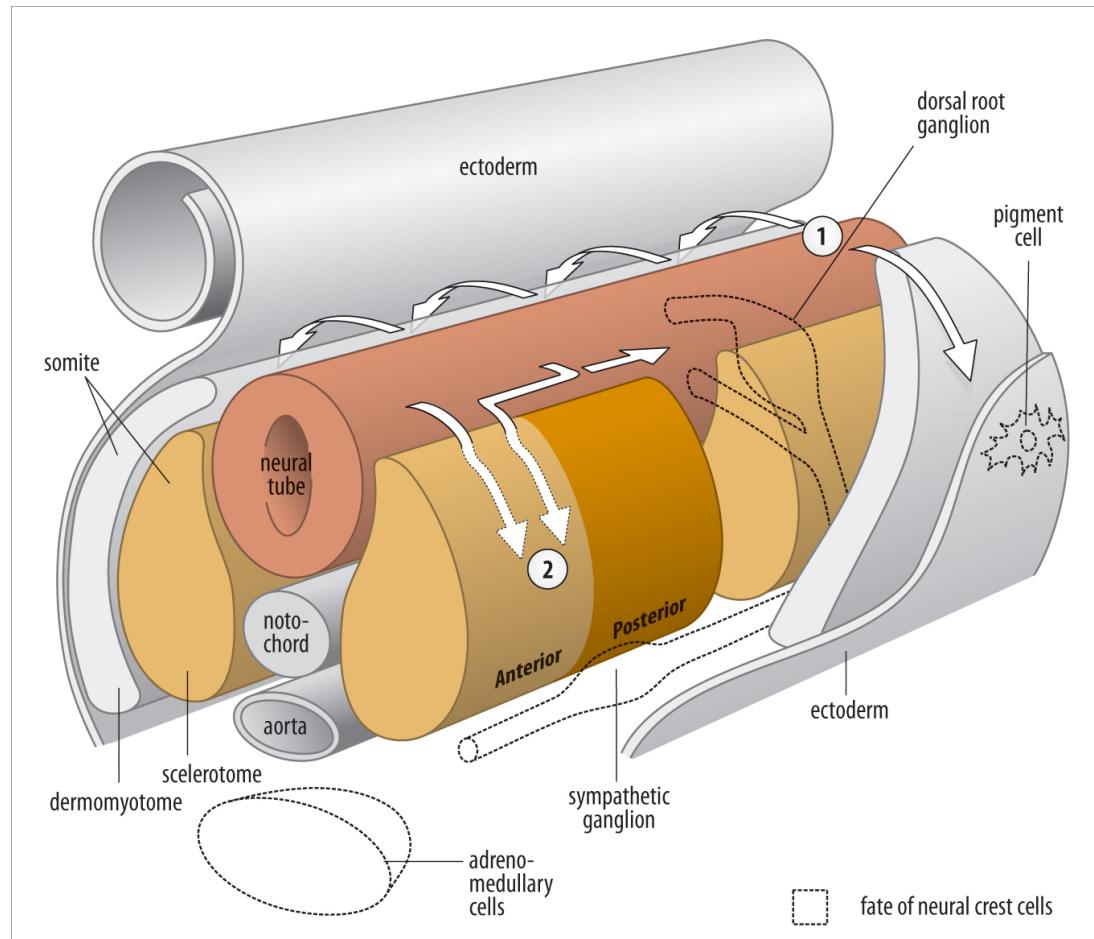


The cytoskeleton, cell-shape change and cell movement



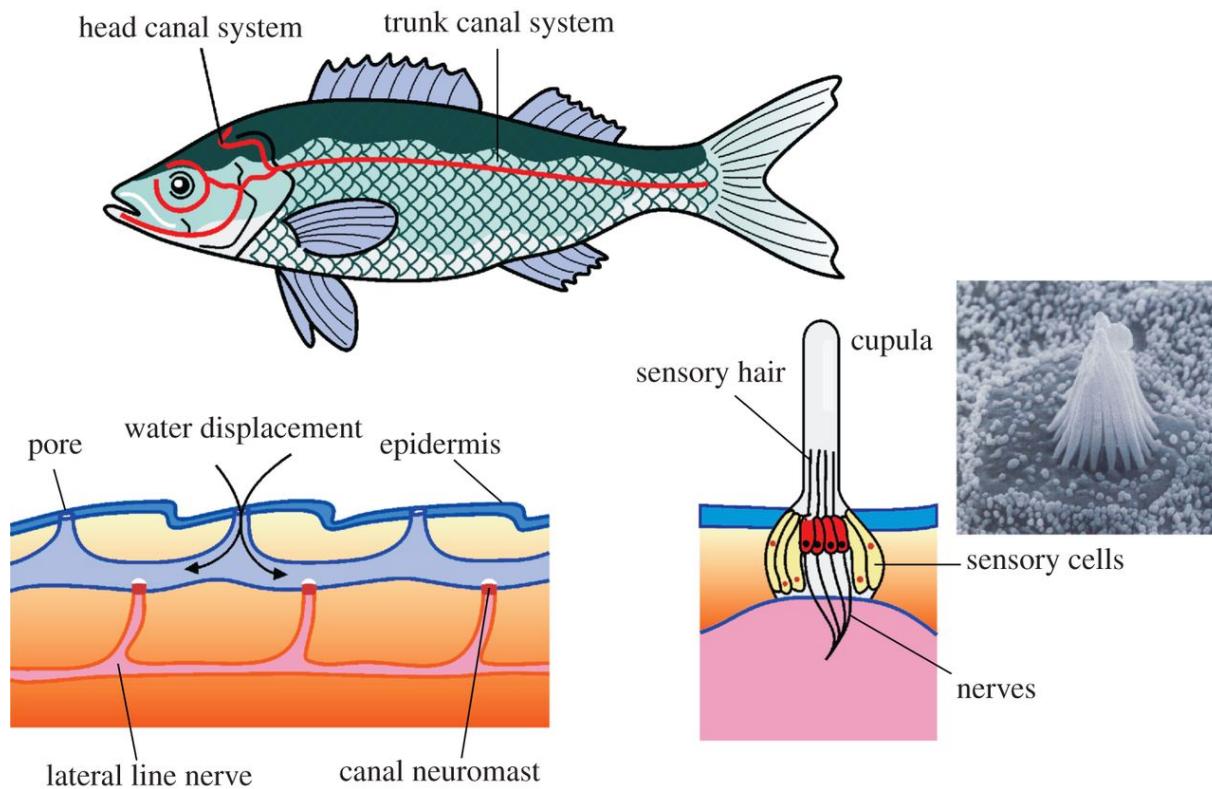
Cell migration

Neural crest cell migration

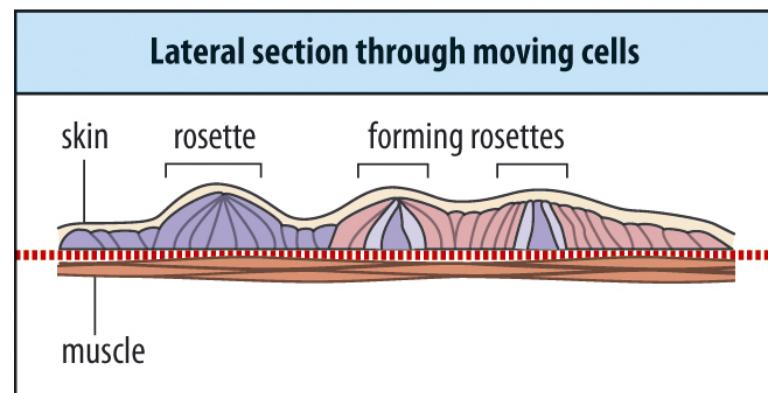
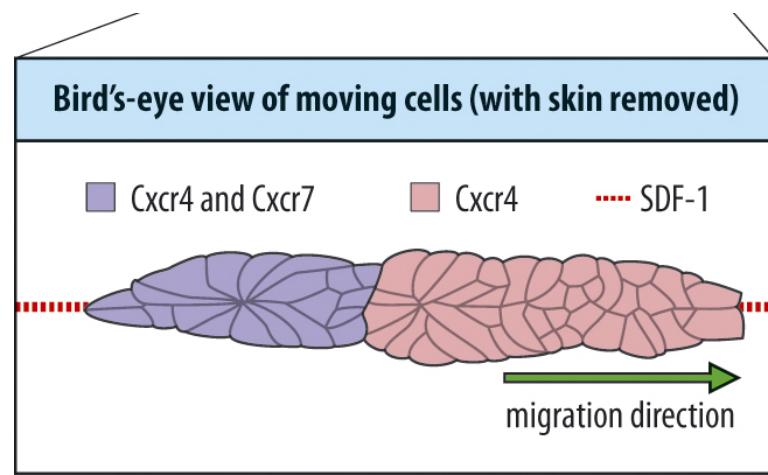
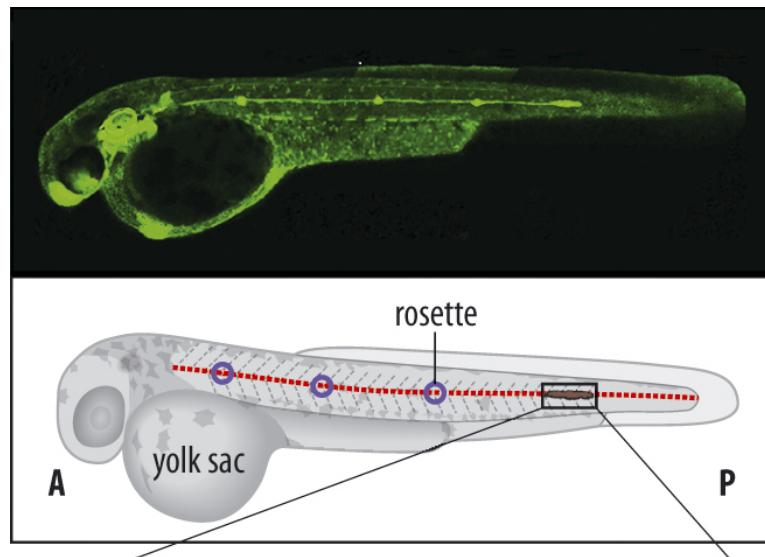


Lateral line

- The lateral line is a system of sense organs found in aquatic vertebrates, used to detect movement, vibration, and pressure gradients in the surrounding water.



Collective cell migration in zebrafish lateral-line formation



Thanks!

Sorting out of different cell types

