Cadherin

Cadherins (named for “calcium-dependent adhesion”) are a class of type-1 transmembrane proteins. They play important roles in cell adhesion, forming adherens junctions to bind cells within tissues together. They are dependent on calcium (Ca2+) ions to function, hence their name.

The cadherin superfamily includes cadherins, protocadherins, desmogleins, and desmocollins, and more.

Protocadherins (Pcdhs) is the largest mammalian subgroup of the cadherin superfamily of homophilic cell-adhesion proteins.

In structure, they share cadherin repeats, which are the extracellular Ca2+-binding domains. There are multiple classes of cadherin molecule, each designated with a prefix (in general, noting the type of tissue with which it is associated). It has been observed that cells containing a specific cadherin subtype tend to cluster together to the exclusion of other types, both in cell culture and during development.

For example, cells containing N-cadherin tend to cluster with other N-cadherin-expressing cells. However, it has been noted that the mixing speed in the cell culture experiments can have an effect on the extent of homotypic specificity.

In addition, several groups have observed heterotypic binding affinity (i.e., binding of different types of cadherin together) in various assays.

One current model proposes that cells distinguish cadherin subtypes based on kinetic specificity rather than thermodynamic specificity, as different types of cadherin homotypic bonds have different lifetimes.

Glial cell derived neurotrophic factor (GDNF) and N-cadherin interact to transduce intracellular signaling. However, the specific molecular mechanisms of this interaction are unclear.