# Keratin filaments bind cell-cell adhesion complexes

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# Introduction

Reactome is open-source, open access, manually curated and peer-reviewed pathway database. Pathway annotations are authored by expert biologists, in collaboration with Reactome editorial staff and cross-referenced to many bioinformatics databases. A system of evidence tracking ensures that all assertions are backed up by the primary literature. Reactome is used by clinicians, geneticists, genomics researchers, and molecular biologists to interpret the results of high-throughput experimental studies, by bioinformaticians seeking to develop novel algorithms for mining knowledge from genomic studies, and by systems biologists building predictive models of normal and disease variant pathways.

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## Literature references

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Sidiropoulos, K., Viteri, G., Sevilla, C., Jupe, S., Webber, M., Orlic-Milacic, M. et al. (2017). Reactome enhanced pathway visualization. *Bioinformatics, 33*, 3461-3467. ↗

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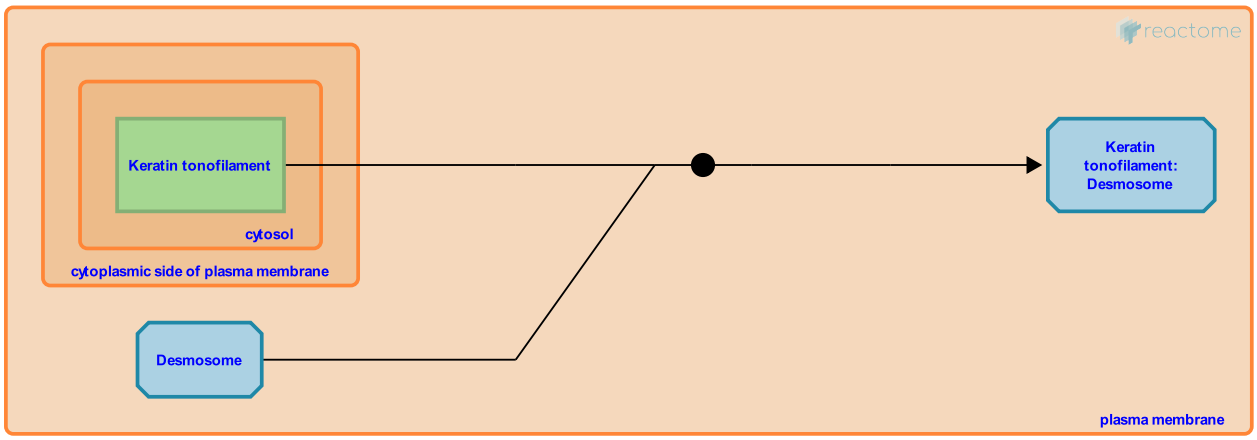
**Stable identifier:** R-HSA-6809393

**Type:** binding

**Compartments:** cytosol, plasma membrane




Keratin filaments bind cell-cell adhesion complexes such as desmosomes and hemidesmosomes, transferring mechanical forces between cells and maintaining cytoskeletal integrity (Hanakawa et al. 2002). The stability of the tonofilament-desmosome interaction depends, in part, on the type of keratin present in the cell (Loschke et al. 2016).

At the ultrastructural level, desmosomes appear as electron dense discs approximately 0.2-0.5 μm in diameter, which assemble in a mirror-image arrangement at cell-cell interfaces (North et al. 1999, Al-Amoudi et al. 2011, Kowalczyk & Green 2013). Large bundles of filaments extend from the nuclear surface and cell interior out towards the plasma membrane, where they attach to desmosomes by interweaving with the cytoplasmic plaque of the adhesive complex. The head domains of keratins bind the tail domains of desmosomal cadherin molecules such as plakoglobin (Dusek et al. 2007), plectin, periplakin, envoplakin and desmoplakin (Bornslaeger et al. 1996, Kazerounian et al. 2002), thereby anchoring the cytoskeleton to the cell membrane.

The five major desmosomal components are the desmosomal cadherins, represented by desmogleins (DSG1-4) and desmocollins (DSC1-3), the armadillo family members, plakoglobin (PG) and the plakophilins (PKP1-3), and the plakin linker protein desmoplakin (DSP), which anchors the intermediate keratin filaments.

Certain adhesion complex proteins are expressed only when cornification commences. These include desmoglein-1, desmocollin-1, envoplakin, periplakin, plakophilin-1 and corneodesmosin (Candi et al. 2005). This expression is associated with changes in desmosome mophology whereby the cytoplasmic plaque integrates with the cornified envelope (Serre et al. 1991, Simon et al. 2001). Deregulation of desmosome formation can lead to degenerative cutaneous diseases (Brooke et al. 2012, Cirillo 2014).

## Literature references

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## Editions

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| 2016-03-10 | Authored | Jupe, S. |
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