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The specific role of transmembrane domain in syndecan functions

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Syndecans, cell surface adhesion receptors initiate intracellular events through receptor clustering, which is mediated by the transmembrane domain. However, the exact role of the transmembrane domain is not fully understood. Here, we investigated the role of the transmembrane domain in syndecan function. Syndecan-2 mutants that transmembrane domain was replaced with that of syndecan-4 were defective in syndecan-2-mediated attachment and migration of rat embryonic fibroblasts cells on fibronectin, suggesting the specific role of syndecan transmembrane domain. Compared with wild type, syndecan-2 mutant showed reduced SDS-resistant dimer formation, and reduced intermolecular interaction between syndecan-2 molecules, which was critical for oligomer formation of syndecan-2. Consistently, altered oligomerization tendency in syndecan-2 mutant resulted in weaker interaction of syndecan-2 on fibronectin, and subsequent focal adhesion formation. Taken together, these data suggest that each transmembrane domain of syndecan plays a specific role in regulating syndecan functions.