The involvement of microtubules in the presence and localization of cellular junctions in primary tendon cells

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ABSTRACT
Tendinopathy, a widespread problem in relation to the poor regenerative capacity of tendons, is the degradation and changes in composition of the tendon tissue. When a rupture occurs, tenocytes deform and remain differently shaped and organized in comparison with tenocytes in healthy tendons. Moreover, collagen fibers are more randomly organized. Connexins (cxs), especially connexin 43 (cx43) and connexin 32 (cx32) are gap junctions, involved in the degradation and synthesis of collagen in tenocytes. In other cell types cadherin-11 (cdh-11), an anchor protein for adjacent cells, co-localize with these gap junctions and are target proteins for the delivery of these cxs by microtubules. Therefore, the presence and co-localization of cx43, cx32 and cdh-11 and the involvement of microtubules in this process was studied in tendon derived cells (TDCs). By staining these different complexes with different fluorescent antibodies, this was achieved. The results showed the presence and co-localization of cdh-11, cx43 and microtubules in TDCs in adjacent cell communication and in the cytosol, close to the nucleus. Also the first evidence for the delivery of cxs to cdh-11 by microtubules was obtained. Cx32 was not found in these TDCs. However, due to a low resolution in the images obtained by the microscopes, this co-localization and delivery was not proven unambiguously, therefore further research is required.

GRAPHICAL ABSTRACT