

Biomaterials for parathyroid tissue regeneration using tonsil-derived mesenchymal stem cells

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Hypoparathyroidism mostly occurs when parathyroid gland does not secrete sufficient parathyroid hormone (PTH) as a consequence of parathyroidectomy (PTX) after thyroidectomy. Lack of circulating PTH can induce hypocalcemia.

To treat the hypoparathyroidism, direct injection of rhPTH and autografting isolated parathyroid tissues are currently available regardless of its several limitations. To develop the better therapeutics, we adopted newly isolated adult stem cell, tonsil-derived mesenchymal stem cells (TMSC) as a stem cell therapy source. To regenerate parathyroid gland, we used differentiated TMSC (dTMSC) loaded hydrogel system and concave microwell culture system to form TMSC-spheroids. Both modified TMSC showed almost complete recovery of survival rates and serum levels of iPTH and iCa^{2+} for 1 month and 3 month, respectively. Taken together, TMSC can be a new and valuable adult stem cell source for recovery of parathyroid function when it was modified with biomaterials.