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Immunohistochemical investigation of preadipocyte factor-1 expression in genetically different cattle

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Preadipocyte factor-1 (pref-1) is a preadipocyte-specific transmembrane protein responsible for playing a crucial role in cellular differentiation. Overexpression of pref-1 in preadipocyte cell cultures prevents adipocyte differentiation, whereas inhibition results in the formation of adipocytes. Pref-1 possesses six Epidermal Growth Factor (EGF)-like repeats in its extracellular region which may interact with EGF-like or other protein motifs present in extracellular matrix molecules, inhibiting the cytoskeletal modeling required for adipocyte differentiation. In order to further characterize the process of adipocyte differentiation in bovine muscle tissue, pref-1 polyclonal antibodies were used to immunolocate preadipocytes in bovine muscle tissue. Using fluorescence immunohistochemistry (FIHC), a cell culture of bovine embryonic preadipocytes was initially used as a positive control to ensure that the antibodies would immunolocate bovine preadipocytes. The pref-1 protein was immunolocated to the cell surface of all preadipocytes. FIHC was then used to immunolocate pref-1 in bovine muscle tissue. The pref-1 protein was immunolocated to the connective tissue, near fat cells, and near blood vessels. Due to the low number of positive reactions, the preadipocyte cell may exist in the adult tissue for relatively short periods of time. Conversely, the majority of adipocyte development may occur at a very early stage of animal development.