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Immunohistochemical Localization of Preadipocyte Factor-1: Potential Marker of Preadipocytes in Bovine Muscle Tissue

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ABSTRACT

The objective of the present study was to develop an immunohistochemical technique to locate preadipocytes in bovine muscle tissue. Preadipocyte factor-1 (pref-1) is a transmembrane protein that is part of the family of Epidermal Growth Factor-like repeat-containing proteins that are involved in cell fate determination. Pref-1 is highly expressed in preadipocytes, but expression is completely abolished during differentiation into an adipocyte. In the present study, reverse transcription polymerase chain reaction demonstrated that bovine intramuscular adipose tissue contains the three splice forms of pref-1 (A, C2, and E). Western blots were used to confirm that the protein for pref-1 was expressed in intramuscular adipose tissue. Polyclonal antibodies against pref-1 were tested against a cell culture of bovine preadipocytes from an embryo source to confirm that the antibody would immunolocate bovine preadipocytes. The antibody was applied to sections of *longissimus dorsi* muscle from Charolais and Holstein cattle. Immunohistochemical results showed that pref-1 is expressed in the perimycium near mature adipocytes and blood vessels. The pool size of preadipocytes appeared to be low. Previous reports, however, have demonstrated that preadipocytes are known to divide and/or migrate providing a potentially endless source of adipogenic precursor cells.