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Pituitary stem cells: review of the literature and current understanding.

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Abstract

BACKGROUND: The existence of pituitary stem cells in the adult pituitary gland is supported by such findings as postnatal proliferation, differentiation based on environmental alterations, and development of hormone-producing cells after specific lesions in the pituitary.

OBJECTIVE: We discuss which cells in the adult pituitary gland might play a role as pituitary stem cells, the potential for these cells to initiate pituitary adenomas, and possible future clinical implications.

METHODS: We reviewed the English literature in search for scholarly articles related to stem cells in the adult pituitary, cells with embryonic profile in the adult gland, mitogenic characteristics of adult pituitary cells, and pituitary adenoma oncogenesis.

RESULTS: We identified and analyzed 135 articles related to pituitary stem cells and pituitary development published since 1965. Stem cell characteristics, including renewal, proliferation abilities, and the presence of stem cells markers, have been demonstrated by adult pituitary cells from mammals. However, the proliferation ability observed so far is limited, and the potential of differentiation into hormone-secreting cells remains to be conclusively proven. Stem cell markers have been detected in animal models of pituitary tumorigenesis; however, a direct connection has not been demonstrated.

CONCLUSION: Research into the capacity of "pituitary stem cells" to differentiate in vitro and in vivo will clarify the mechanisms for regulation of these cells. As pituitary stem cells are better understood, clinical applications like the treatment of pituitary adenomas and the implantation of pituitary stem cells for hormonal deficiencies may be developed.

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