

Regeneration of Endocrine Gland - Hypophysis

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Abstract

The adult pituitary gland is capable of regeneration of transgenically ablated growth of hormone-producing (GH(+)) somatotropes. Regeneration of tissue promises for the better treatment for many of the human pathology that affects neural tissue, cardiac tissue, pancreas, cochlear hair cells and bones. Even when the cell turnover is lower, pituitary stem cells do exist and can regenerate endocrine cells of pituitary gland in response to physiological stressors. By understanding the ability of manipulation regeneration of pituitary, therapeutic treatment for patients suffering from hypopituitarism can be improved.

Keywords: *Regeneration; Endocrine Gland; Hypopituitarism*

Introduction

The endocrine system is involved in various functions of body such as hormones secretion and its action on the target tissues. Endocrine glands are ductless glands of the endocrine system that secretes hormones directly into the blood stream. Pineal gland, pituitary gland (hypophysis), pancreas, thyroid gland, testes, ovaries, parathyroid gland, hypothalamus and adrenal gland are the major glands of the endocrine system.

Regeneration of tissues provides improvement in treatment of many human physiology which affects cardiac tissues, neuro tissue, pancreas, bones and cochlear hair cells. Hypophysis stem cells live in the marginal zone and involve various other stem cell markers also including the sex determining region SOX2. The regeneration of pituitary gland involves elaboration of the SOX2 marginal zone which included cell transitioning from progenitors to terminally differentiated somatotropes. In case of loss of regenerative capacity, there is a reduction in stem cells, specially in the ones that contain SOX2. The nuclear SOX2 is indicative of healthy stem cells that have capacity to regenerate. In order to maintain the health and regenerative capacity of stem cells, regular proliferation is necessary. On the other hand, excessive proliferation of neural stem cells depletes the regenerative capacity and lead to degeneration of neurons. It is also observed that depletion of Foxo family members in hematopoietic stem cells leads its pathway into the cell cycle which eventually depletes its capacity for regeneration.

The capacity of regeneration of the pituitary is restricted to age and its efficacy and is completely dependent on the activation of stem cell associated pathway.

Health goals can be achieved successfully and treatment for patients dealing with hypopituitarism and pituitary adenomass can be improved by understanding the equilibrium between pituitary cell proliferation and differentiation our goal is to improve human health. By

analysing the time of phase of cell cycle during the differentiation of hypophysis, necessary information regarding cell specification can be obtained. Molecules that affect pituitary cell cycle can be modified and benefit in providing improved therapies for patients with pituitary pathologies. Future studies need to be done in order to understand the molecules that regulate regeneration of hypophysis.

Conclusion

It is known that the regeneration of hypophysis is possible provided that the dominating hypothalamic centers remain uninjured during hypophysectomy. Regeneration of hypophysis is possible only if the superadded hypothalamic centers are functioning. The hypophysiotropic hormones of the hypothalamus not only cause the release of pituitary hormone but also initiates the hormone synthesis and growth of pituitary.

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