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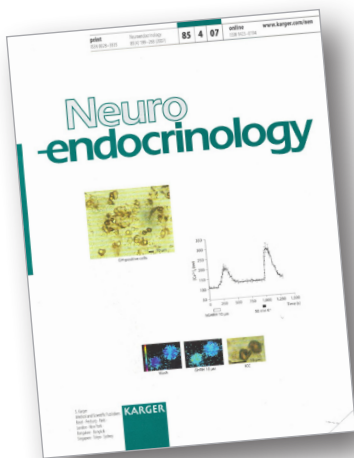
Cooperative State
Research, Education,
and Extension Service

National Research Initiative (NRI)

Exploring How Growth Hormones are Released in Animals

by Stacy Kish, CSREES

A team of scientists in Iowa studied how the release of hormones in animals of agricultural importance can lead to greater efficiency of growth and meat quality. Their results could reduce the cost of animal production and enhance profitability for farmers. >>



Above: The article received the cover of the journal Neuroendocrinology.

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Growth hormones (GH) control the growth, metabolism and deposition of muscle and fat in mammals and poultry. With funding from USDA's Cooperative State Research, Education, and Extension Service's (CSREES) National Research Initiative (NRI) program, scientists examined how secretion of growth hormones in individual cells is induced.

"Deep at the base of the brain, the pea-sized pituitary gland is part of the endocrine system that secretes hormones to regulate bodily functions. Specialized cells, called somatotropes, secrete a growth hormone that controls growth and metabolism in animals.

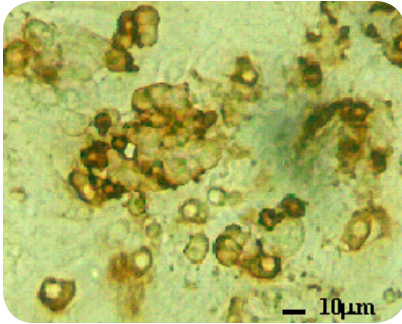
Somatotropes, however, do not automatically secrete growth hormones. It takes many different GH-releasing hormones to stimulate somatotrope to secrete growth hormones. Being able to regulate the release of growth hormones may have a powerful impact on the quality of animal products and on medical treatments in humans.

Colin Scanes, Lloyd Anderson and colleagues at the Iowa State University examined calcium ion sensitivity to GH-releasing hormones. The scientists determined that one specific GH-releasing hormone, called gonadotropin-releasing hormone (GnRH), expressed calcium ion sensitivity in 40 percent of somatotropes. Interestingly, the GnRH releasing activity decreased in calcium ion-poor mediums.

The calcium ion sensitivity found in specific GH-releasing hormones may reflect how different types of cells communicate. This work expands on what is known of the different types of somatotropes and the preliminary evidence of how these cells function.

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Above: The presence of somatotropes was confirmed by immunocytochemical staining with anti-GH antibody.

Credit: Lloyd Anderson

Scientists know that GnRH stimulates the release of growth hormones in several important fish species, including tilapia and rainbow trout. The findings from this project may lead to improvements in management and feeding strategies to naturally stimulate the release of growth hormones in agriculturally important animals.

CSREES funded this research project through the NRI Animal Growth and Nutrient Utilization program. CSREES advances knowledge for agriculture, the environment, human health and well-being, and communities by supporting research, education and extension programs in the Land-Grant University System and other partner organizations. For more information, visit www.csrees.usda.gov. ■

NRI awards grants for research, education, and extension activities that address key problems of national and regional importance in biological, environmental, physical, and social sciences relevant to agriculture, food, the environment, and communities on a peer-reviewed, competitive basis. For more information, visit:

<http://www.csrees.usda.gov/funding/nri/nri.html>

References

Scanes, C.G., A. Glavaski-Joksimovic, S.A. Johannsen, S. Jeftinija, and L.L. Anderson. 2007. Subpopulations of Somatotropes with Differing Intracellular Calcium Concentration Responses to Secretagogues. *Neuroendocrinology* 85:221-231.

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