

NOTICE OF PUBLICATION



AQUAFISH COLLABORATIVE RESEARCH SUPPORT PROGRAM

RESEARCH REPORTS

Sustainable Aquaculture for a Secure Future

Title: Cloning and characterization of leptin in a Perciform fish, the striped bass (*Morone saxatilis*): Control of feeding and regulation by nutritional state

Author(s): Eugene T. Won, David A. Baltzegar, Matthew E. Picha, Russell J. Borski

Department of Biology, North Carolina State University, Raleigh, NC 27695-7617, USA

Date: July 12, 2012

Publication Number: CRSP Research Report 12-304

The CRSP will not be distributing this publication. Copies may be obtained by writing to the authors.

Abstract: In mammals, leptin is an anorexigenic peptide hormone that regulates energy homeostasis. It is produced predominantly by white adipose tissue and circulates as an endocrine indicator of energy reserves. Teleost leptin has been characterized in a few fish species, but its regulation is not well understood, particularly in response to nutritional status. In this study, we cloned a putative leptin in striped bass (*Morone saxatilis*) and report the first characterization of leptin in a Perciforme, the largest and most diverse order of fish. The striped bass leptin coding sequence was 65% homologous with pufferfish, 52% with Atlantic salmon, and 46% with human. PCR showed that leptin mRNA was exclusively expressed in the liver, and not adipose or other tissues. The leptin coding sequence of striped bass and the more widely cultured hybrid striped bass variety (HSB; *Morone chrysops*, white bass *M. saxatilis*) were identical. We then evaluated whether the metabolic status of HSB might alter leptin gene expression. Juvenile HSB were subjected to 3 weeks feed deprivation followed by 3 weeks of refeeding. Quantitative PCR showed that fasting for 3 weeks reduced hepatic leptin mRNA levels relative to fed controls. Leptin mRNA levels then increased upon refeeding, albeit levels were not completely restored to those seen in control fish fed throughout the experiment. Intraperitoneal injection of human leptin suppressed appetite in HSB. In as much as hepatic HSB leptin mRNA is regulated by nutritional state and has a corresponding anorexigenic

CRSP RESEARCH REPORTS are published as occasional papers by the Program Management Office, Aquaculture Collaborative Research Support Program, Oregon State University, 418 Snell Hall, Corvallis, Oregon 97331-1643 USA. The Aquaculture CRSP is supported by the US Agency for International Development under CRSP Grant No. EPP-A-00-06-00012-00 and by collaborating institutions. See the website at <aquafishcrsp.oregonstate.edu>.

Continued...

effect, our results suggest that leptin may play a role in energy homeostasis in these advanced Perciformes.

This abstract is excerpted from the original paper, which was published in *General and Comparative Endocrinology* 178 (2012) 98–107.

CRSP RESEARCH REPORTS are published as occasional papers by the Program Management Office, Aquaculture Collaborative Research Support Program, Oregon State University, 418 Snell Hall, Corvallis, Oregon 97331-1643 USA. The Aquaculture CRSP is supported by the US Agency for International Development under CRSP Grant No. EPP-A-00-06-00012-00 and by collaborating institutions. See the website at <aquafishcrsp.oregonstate.edu>.