Salmon in hot water

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Rearing juvenile salmon at the relatively high temperature of 16 C causes skeletal deformities in the fish. Researchers writing in the open access journal *BMC Physiology* investigated both the magnitude and mechanisms of this effect, which occurs when salmon farmers use warmed water to increase fish growth rates.

Harald Takle worked with a team of researchers from NOFIMA (the Norwegian Institute of Food, Fisheries and Aquaculture Research), Norway, to carry out the studies. He said, "The data presented here indicate that both production of bone and cartilage were disrupted when promoting fast growth using elevated temperature. It is very likely that higher temperatures result in the increased rate of deformities observed in the 16 C group".

The researchers reared 400 fish in 10 C water and another 400 at 16 C. The fish in the 16 C water grew faster, but 28% were found to show some signs of skeletal deformity, compared to 8% of the fish reared in the cooler tank. Takle said, "Our results strongly indicate that temperature induced fast growth is severely affecting gene transcription in osteoblasts and chondrocyte bone cells, leading to a change in the tissue structure and composition".

In a second related study, fish with vertebral deformities were studied in detail. Takle said, "The deformity process involves molecular regulation and cellular changes similar to those found in mammalian intervertebral disc degeneration".

More information:

1. Molecular pathology of vertebral deformities in hyperthermic Atlantic salmon (Salmo salar), Elisabeth Ytteborg, Grete Baeverfjord, Jacob Torgersen, Kirsti Hjelde and Harald Takle, BMC Physiology (in press)
2. Morphological and molecular characterization of developing vertebral fusions using a teleost model, Elisabeth Ytteborg, Jacob Torgersen, Grete Baeverfjord and Harald Takle, BMC Physiology (in press), www.biomedcentral.com/bmcphysiol/

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