

The effect of stress on Atlantic salmon's congenital immunity to IPN

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Stress affects the congenital immune defence system. New doctoral research has revealed how stress can lower the immunity of salmon and increase its susceptibility to viral infection.

Furthermore, stress can increase the propagation of viruses in the fish's [internal organs](#) and can cause "benign" viruses to turn "pernicious".

Koestan Gadan has studied the consequences of stress on the innate immune defence system of the salmon and how it makes the fish more susceptible to disease. She chose the IPN virus (infectious [pancreatic necrosis](#)) as a model virus for her research. IPN is the cause of considerable losses in Norwegian [salmon farming](#) and has for many years been the most frequently diagnosed disease for this fish.

Up until now, there has been little documentation of how different [environmental factors](#) affect salmon's immune defence system. Changes in temperature and salinity, too much or too little oxygen in the water, pollution and physical handling are all sources of stress for these fish. The same applies to normal physiological changes such as for example smoltification, i.e. the way the fish prepares itself for the transition from fresh to seawater.

Gadan discovered that these stress factors lead to increased production of the [stress hormone cortisol](#) in the fish. This increase in the level of cortisol affects the immune system of the fish and weaker immunity makes them more susceptible to infections. The fact that stress can trigger an outbreak of IPN is corroborated by the experiences of many in the field. Gadan's research shows that various environmental factors are stressful to the fish, in turn triggering an increase in the level of cortisol in the blood and causing harm to their congenital [immune defence](#) system, which is essential to their capacity to ward off [viral infections](#).

Gadan also demonstrated that [chronic stress](#) leads to a high level of cortisol over time, which results in increased mortality, a high propagation of viruses and chronic infections. For the first time, she was able to prove that when infected salmon fry were exposed to stress, otherwise benign variants of the IPN virus changed into pathogenic viruses. In other words, stress lowers resistance, increases the "production" of IPN virus in the fish's internal organs and can lead to benign viruses changing into pernicious variants of the virus.

Cand.Scient. Koestan Gadan defended her doctoral research at the Norwegian School of Veterinary Science on 17th December with a thesis entitled: "Studies on stress and innate immunity in relation to infectious pancreatic necrosis virus in Atlantic salmon (*Salmo salar* L.)"

Provided by Norwegian School of Veterinary Science

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