

Fish Iridescence for Protection

The silvery sheen seen on many fish is not only attractive to look at, but it also has a practical purpose.

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A number of koi and goldfish varieties, display this shiny appearance. The characteristic silvery sheen seen on many fish is not only attractive to look at, but it also has a practical purpose, according to research from Professor Lia Addadi and her team from the Department of Structural Biology at the Weizmann Institute of Science in Israel.

This distinctive iridescence is the result of guanine crystals set in the skin beneath the fish's scales, which reflect light like a mirror. Many fish, including a number of koi and goldfish varieties, display this shiny appearance. But it is also very common in many nondomesticated species such as various hatchetfish, particularly those which occur in relatively open stretches of water close to the surface, where light penetrates well.

The resulting silvery iridescence is believed to offer protection to the fish, which are otherwise readily exposed to predators. By reflecting light away from the body towards an onlooker these crystals help to conceal the fish's presence in the water, acting like a cloaking device.

The latest research has concentrated primarily on the shape of the guanine crystals, using X-ray diffraction as well as electron microscopy to enable them to be studied at high magnification. The crystals found in fish have been compared with crystals grown in laboratory surroundings, and the findings are quite remarkable.

The guanine crystals associated with fish do not grow in the same way as they do under laboratory conditions. Instead, they have become a unique shape which maximizes their reflective potential, and therefore increases the protection given to the fish as a result.