Superior offspring without genetic modification

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We don't always turn out like our parents. Sometimes we become even better. How this happens is the subject of a new research project at the University of Gothenburg.

When two gene pools combine, you might expect the characteristics of the offspring to end up somewhere in the middle between those of its parents. But children often have characteristics that are better or worse than that middle value, sometimes even better than both parents.

This is not a newly-recognized phenomenon. Indeed, it has been exploited to breed better horses, redder tomatoes, more nutritious rice, and salmon that can thrive in fish farms, to mention but a few examples.

Heterosis is the scientific term for being better than your parents. Why does heterosis occur? What is the molecular mechanism? How common is it? How can we make it happen more often and to greater effect? Researchers at the Department of Cell and Molecular Biology at the University of Gothenburg and the Norwegian University of Life Sciences outside Oslo are aiming to find answers to these questions in a new research project.

Using baker's yeast as a model, Jonas Warringer and his colleague Stig Omholt are mapping the incidence of heterosis for a large number of different characteristics. They hope to discover the mechanisms in human cells that govern the creation of children with characteristics sometimes superior to those of their parents. They are initially studying

yeast cells - in which the mechanism has already been established.

In their first studies, Warringer and Omholt have shown how heterosis has enabled brewer's yeast to develop tolerance to copper, something that helps the yeast to survive in the large copper tanks used in the brewing industry. After some of the results where published in Nature in March this year, the interest in Warringers and Omholts research has increased.

"Once we understand how heterosis occurs, breeding can be controlled so that we can selectively promote desirable characteristics in plants and animals more quickly and effectively. This could help in the fight against famine, help us develop new biofuels for cars, and possibly, in the distant future, make it possible to create a functioning ecosystem on Mars - without having to resort to genetic modification," says Jonas Warringer.

Source: University of Gothenburg (news : web)