

2 genes found to play crucial role in cell survival

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New research suggests that two recently discovered genes are critically important for controlling cell survival during embryonic development.

The genes, called E2F7 and E2F8, are the least understood members of a family of genes that play a fundamental role in animal development. Members of this family are also involved in cancers of the breast, bladder, stomach and colon.

This animal study showed that complete loss of the two genes causes massive cell death and is lethal in developing embryos.

It also showed that the two genes prevent this cell death largely by suppressing the activity of another member of the family, called E2f1. This third gene is known to play an important role in triggering programmed cell death, or apoptosis, in embryos.

The findings by researchers at the Ohio State University Comprehensive Cancer Center are published in the Jan. 15 issue of the journal *Developmental Cell*, with an accompanying commentary.

“Until now, almost nothing was known about the function of these two genes in animals,” says principal investigator Gustavo Leone, an associate professor of molecular virology, immunology and medical genetics at Ohio State’s Comprehensive Cancer Center.

“Our study not only shows that both these genes are critical for

embryonic development, but also how members of this gene family work together to regulate cell survival and proliferation.”

Leone and his colleagues used mice that were missing either E2f7 or E2f8, or both genes, and mice missing both genes and the E2f1 gene.

Their experiments showed that embryos survived, and massive cell death was prevented, if they had at least one copy (of the normal two) of either of the two genes.

When the two genes were entirely missing, however, massive cell death and other problems occurred that were lethal before birth. On the other hand, embryos that were completely missing both genes and missing the E2f1 gene, did not show the massive cell death, although they also died before birth. “This of course means that E2f7 and E2f8 are doing more than just regulating cell death, and we are now exploring new avenues of their function,” Leone says.

“Overall,” he says, “our findings indicate that these two genes are essential for embryonic development and for preventing widespread cell death, mainly by targeting the E2f1 gene.”

Source: Ohio State University Medical Center

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