

## Preventing a craniofacial disorder

Treacher Collins syndrome (TCS) is a craniofacial development disorder that affects roughly 1 in 50,000 people. It is characterized by underdeveloped facial bones, which frequently results in a sunken appearance in the middle of the face, a prominent nose, a very small jaw and chin and downward-slanting eyes; some affected individuals also have cleft palate and malformed or absent ears. Now, researchers have found a way to prevent development of the disorder in a mouse model by inhibiting the function of p53, a tumor suppressor protein.

TCS is caused by a mutation in the gene *TCOF1* that causes death in neural crest cells early in embryogenesis. In normal development, these cells would form the bone, cartilage and connective tissue of the face. The new research, led by Paul A. Trainor (Stowers Institute for Medical Research, Kansas City, MO), used mice genetically modified to model TCS. Trainor's group showed that inhibition of p53 prevented the death of neural crest



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cells and the resulting craniofacial anomalies in these mice (*Nat. Med.* published online 03 February 2008; doi:10.1038/nm1725).

Trainor and his colleagues did a series of experiments to map the connection between p53 and *TCOF1*. They tested two ways of inhibiting p53: a chemical inhibitor called pifithrin- $\alpha$ , and genetic inactivation of one of both copies of the gene encoding p53. Both methods successfully

stopped the death of neural crest cells and prevented craniofacial malformation and neonatal mortality.

Trainor's work suggests that inhibition of p53 function might be able to prevent TCS in humans, as well as offer therapeutic potential for other types of congenital craniofacial anomalies. Natalie C. Jones, first author of the report, stated, "The successful rescue of neural crest cell development in a congenital craniofacial anomaly such as TCS is exciting because it provides an attractive model for the prevention of other craniofacial birth defects of similar origins."

The treatment did have at least one drawback: loss of p53 function was associated with the development of spontaneous tumors in mice. The authors have not identified any humans with TCF who also have tumors. Future research in this area might include identifying therapeutic targets that do not carry a risk of tumorigenesis, such as proteins that work with p53.

**Monica Harrington**

## DO CHIMPS UNDERSTAND THE TRICK OF THE TRADE?

New research suggests that what separates us from the apes may be our talent for trading: chimpanzees, it seems, just don't have it in them.

Economists believe that barter—whereby an individual must give up something valuable in exchange for another valuable commodity—lies at the root of human economic development. In an effort to provide more insight into this phenomenon, a group of researchers led by Sarah Brosnan of Georgia State University (Atlanta) and Mark F. Grady of the University of California, Los Angeles investigated the circumstances under which chimpanzees might engage in similar behavior.

The researchers tested two groups of chimpanzees, one that had undergone extensive cognitive training and one that hadn't (*PLoS ONE* 1, e1518; 2008). Though initially slow to catch on, chimpanzees were trained to exchange one type of food for another. The scientists found that when chimpanzees were given the option of receiving a highly desirable food (grapes) in exchange for an undesirable food (carrot pieces), they were almost always willing to trade. When foods were closer in value, however, such as apple slices and grapes, chimpanzees were far less likely to trade than would be expected based on prior assessment of their preferences.

Both groups of chimpanzees performed similarly, though results varied between individuals.

One possible explanation for chimpanzees' reluctance to trade is the risk that an exchange partner might run away with both commodities. When the potential loss is high in relation to the potential gain, a chimpanzee might be less likely to take a chance. The reliability of the exchange partner is also crucial. "In every case, the experimenter was an individual with whom the chimpanzees had worked for a decade or more," Brosnan tells *Lab Animal*. "I think that they would have been even less likely to barter with an unfamiliar human experimenter, or one whom they disliked."

An additional factor may be that chimpanzees cannot conceive of 'owning' an item unless it is in their possession at a given moment. This means that they do not naturally hoard large quantities of items and would therefore be less likely to develop their capacity for barter. Chimpanzees do, however, exchange services such as grooming and support.

According to Brosnan, the group is currently using chimpanzees trained in symbol language to investigate whether the apes will barter with each other, a situation that may more closely reflect their natural tendencies.

**Karen Marron**