Heavy metals play crucial role in the ability to smell

By Tina Hesman | St. Louis Post-Dispatch
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ST. LOUIS -- Heavy metal smells.

While it may sound like music criticism, the conclusion is actually a new scientific model that may explain for the first time how humans and other mammals detect odors.

Scientists at the University of Illinois have discovered that odor-sensing proteins, called olfactory receptors, may owe much of their stink-detecting capabilities to heavy metals such as zinc or copper.

The discovery is based on simple knowledge that inorganic chemists have had for a long time, but biologists have largely overlooked -- things that bind to metals smell strongly and badly.

"Inorganic chemistry stinks," said Kenneth S. Suslick, a chemist at the University of Illinois at Champaign-Urbana who led the work on smell. The results of the study appear Tuesday in the Proceedings of the National Academies of Science.

The primary function of the olfactory system -- the scientific name for the part of the body responsible for the sense of smell -- is to help mammals avoid spoiled food, Suslick said. Bacteria often give off malodorous chemicals that stick strongly to metals, he said. Those metals -- zinc, copper, iron, magnesium and others -- may come from food and water.

The Illinois researchers have used this bit of wisdom to develop an artificial nose that could help detect noxious chemicals. Metal-binding dyes in the artificial nose change colors when certain odors latch onto the metals. The scientists began to wonder if the human nose worked the same way, Suslick said.

To find out if metals play a role in smell, the Illinois researchers examined DNA sequences of the olfactory receptors.

The sequences weren't hard to come by, Suslick said. Mammals have about 1,000 genes for olfactory receptors. That's about 3 percent of the human genome.