Researchers develop first method to accurately measure zinc in humans

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(Medical Xpress) -- Zinc is an essential nutrient, but until now, there has not been an effective way to measure it in our bodies, say University of Florida researchers.

The researchers have uncovered biomarkers that, for the first time, allow for accurate measurement of human zinc nutritional status. Biomarkers are quantifiable substances in organisms that can indicate body irregularities such as nutrient deficiencies or disease.

The biomarkers can be measured from blood samples or from mouth swabs and allow for even marginal zinc deficiencies to be detected, which is something current zinc tests can't do.

"The method could be used in developing countries, and here in the U.S., to re-examine populations for adequate zinc status," said Bob Cousins, an eminent scholar in nutritional biochemistry with UF's Institute of Food and Agricultural Sciences.

Cousins and a team of researchers made the discovery, and their research was published Wednesday in the journal *Proceedings of the National Academy of Sciences.*

Zinc deficiency is a worldwide problem, especially in developing countries where many have limited access to good sources of zinc, such as red meat, Cousins said. Signs of zinc deficiency are often skin rashes and infections.

“When children are supplemented with zinc, their quality of life dramatically increases,” he said. “Their stature increases, their ability to learn increases and they can better fight off infections that lead to things like diarrhea.”

Roger Sunde, a professor of nutritional sciences at the University of Wisconsin-Madison, is a longtime researcher of biomarkers for selenium, another important element for human health. He called the new study “exciting” and “cutting edge.”

“We really need to understand the underlying biochemistry and regulation of human micronutrients,” Sunde said. “And we really need to have the full complement of tools to know whether someone is adequate in all of the nutrients.”

To find the biomarkers, the researchers performed genetic analysis on human subjects at the beginning of the study, when the subjects were low in zinc due to an experimental diet they were fed, and when the subjects returned to normal zinc levels.

The genetic analysis was done using devices called microarrays that allowed for the examination of each subject’s entire genome, or every gene in their body, in response to changing zinc levels.

Of the tens of thousands of genes analyzed, the researchers identified eight that changed with zinc levels and thus could be used as zinc biomarkers.

Once a zinc deficiency is detected using the biomarkers, it can be easily corrected in a cost-effective manner using supplements, said Moon-Suhn Ryu, a former doctoral student in UF’s food science and human nutrition department’s nutritional sciences program and the study’s lead author.

“Additionally, our findings will let people who are involved in policy design or epidemiological studies identify communities that will benefit from improved zinc nutrition,” Ryu said.

The recommended dietary allowances of zinc for men and non-pregnant and non-lactating women over age 19 are 11 milligrams and eight milligrams, respectively. In addition to red meat, other good sources of zinc include oysters, poultry, beans and zinc-fortified breakfast cereal.

The National Institutes of Health and IFAS funded the research. Other researchers on the team included nutritional sciences professor Bobbi Langkamp-Henken, senior biological scientist Shou-Mei Chang and registered dietitian Meena Shankar.

Provided by University of Florida