TTU researchers' early results show low level arsenic exposure could still cause kidney disease

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LUBBOCK, TX (KCBD) - A Texas Tech University graduate student has received a prestigious award for her research into arsenic toxicology.

For two years, YuWei Chang worked in the Department of Environmental Toxicology at Texas Tech with Associate Professor Dr. Kamaleshwar P. Singh to study how arsenic affects the kidneys.

It is already known that long-term exposure to high levels of arsenic can lead to kidney failure, but Chang and Singh wanted to know how levels of arsenic, like the amount found in our water, could affect our kidneys.

"Historically, kidney disease has been more prevalent in Texas than other states in the U.S.,” said Singh.

We know from an earlier KCBD investigation into arsenic, that water systems in our area have tested positive for pesticides that were used frequently in the 1960's and 1970's.
In a 2016 interview with Dr. Venki Uddameri, the Director of the Water Resources Center at Texas Tech University, he said, "These are human made chemicals and they are extremely resistant over time. They persist for like hundreds of years in some cases, tens of years for sure."

"In the cotton belt area, they have been using pesticides, herbicides that contain arsenic so that make sense, the correlation between arsenic and the high prevalence of kidney disease in the South Plains regions and Texas in general," Singh said.

Singh said in West Texas, many are consuming low levels of arsenic in their drinking water on a daily basis.

In 2001, the Environmental Protection Agency adopted a new standard for arsenic in drinking water of 10 parts per billion, replacing the old standard of 50 parts per billion.

In 2001, EPA Administrator Christine Todd Whitman commented on the change, "The 10 ppb protects public health based on the best available sciences and ensures that the cost of the standard is achievable."

Water systems had to meet the new standard by January 23, 2006.

However, water systems on the South Plains still continue to struggle to meet that standard.

For six months, Singh and Chang exposed human kidney cells to low doses (10 ppb) of arsenic.

"We found that arsenic contamination, or chronic arsenic exposure will cause some changes, which relate to kidney fibrosis or kidney disease in our cell model," Chang said.

"It's a very significant study. Our study has shown that yes, even at the lower dose, that normally we get exposed to, arsenic can actually cause kidney disease," Singh said.

The good news? These researchers also looked into a cure.

"There is a certain drug approved by the FDA which we found can reverse or inhibit the effects of arsenic exposure back to normal kidney cells," said Chang.

The drug is currently being used to treat blood cancer, but these researchers believe it could be used to treat someone with kidney disease.

"This needs to be clinically tested, whether it can be used for kidney disease or not, and if it can be used, what dose of the drug can be used so, it does not have adverse side effects," Dr. Singh said.

While further research is needed, the significance of these findings earned them a spot in the Journal of Cellular Physiology.

Chang also won a renal toxicology award from the Society of Toxicology.

Now they plan to do further testing in hopes this research can save lives.

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