Study may help explain link between uranium exposure and skin cancer

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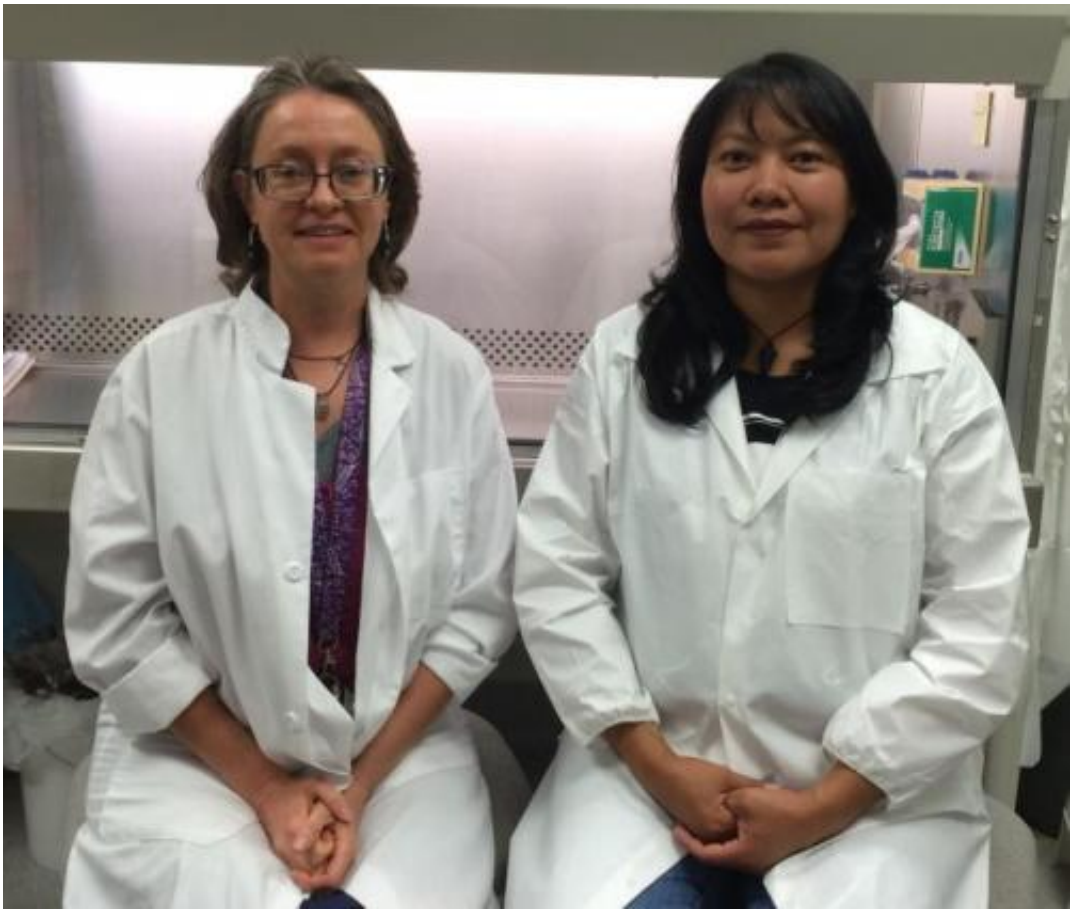

Diane Stearns with co-author and NAU nursing student, Janice Wilson.

After years of delving deep into DNA and researching ways in which metal damage may lead to cancer, a team of researchers is taking a step back to look at the surface where one answer may have been all along.

The varying health risks from exposure to natural uranium are well established, but Diane Stearns, professor of biochemistry at Northern Arizona University, and her team have been trying to determine if there is a link between uranium exposure and skin cancer, stating that skin may have been overlooked in the past.

In a recent article published in the *Journal of Applied Toxicology*, the NAU team shared results from a study that explored photoactivation of uranium as a means to increase its toxicity and ability to damage DNA.

"Our hypothesis is that if uranium is photoactivated by UV radiation it could be more harmful to skin than either exposure alone," Stearns said.

Through the study, the team found that once uranium was present in the skin, exposure to UV radiation or sunlight could be chemically toxic and lead to cancerous lesions. The team members recommend that future risk assessments regarding cancer caused by uranium exposure include the possibility of photoactivation in skin.

They also propose that photoactivated uranium exposure could be even more harmful in cells that can't repair the damage on their own. Stearns explained such cases are found in individuals with Xeroderma Pigmentosum or XP, a disease that causes extreme sensitivity to sunlight.

Through research into the XP cell lines, the team discovered regional relevance for the study. The disease is prevalent on the Navajo Nation, a site of historically high levels of uranium mining and processing in the Southwest.

The 2012 documentary Sun Kissed further piqued the researchers' curiosity. The film cites the incidence of XP in the general population as one in 1 million, yet cases increase significantly to one in 30,000 in the Navajo population.

Stearns believes there may be implications that should be taken into consideration for a population like the Navajo community with carriers of XP mutations and relatively high exposure to uranium and the sun.

"We just want to make people aware that uranium exposure could contribute to skin cancer and could also be exacerbating XP," Stearns said.

Stearns said as she looks to the future, she hopes to fine-tune her understanding of the photoactivation mechanism and how it is damaging DNA. "We have predicted the link but now we would like to study it step by step to establish an even stronger connection."

Together with her Navajo students at NAU, she also hopes to determine whether the old uranium mines might explain the increase in cancer and what is being called a sudden emergence of XP on the Navajo Nation.

"I've had several Navajo students come to me because they found out I was doing uranium research and they had a relative who died of cancer and always wondered if it was uranium," Stearns said. "It's been a really personal way for them to see the value in scientific research because it can directly relate to their community."

Provided by Northern Arizona University