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**UAMS Researchers Find Changes in Monkeypox Genome
That May Explain Its Recent Rapid Spread**

LITTLE ROCK — The rapid spread of monkeypox is unlike the virus’ past outbreaks and may be a result of genetic mutations identified by University of Arkansas for Medical Sciences (UAMS) researchers.

Led by UAMS’ David Ussery, Ph.D., the UAMS team published its findings this month in the [*Journal of Applied Microbiology*](#).

The team compared the genomes of the 2022 virus to monkeypox genomes from a 2017 outbreak in Nigeria, plus sequenced genomes from localized outbreaks in 1965 and 1970. None of the previous monkeypox variants spread beyond their place of origin in Africa.

The UAMS team’s bioinformatics analysis using advanced genomic sequencing methods revealed 25 mutations, 14 of which appear to change protein function and bear further research, said Ussery, a professor in the College of Medicine Department of Biomedical Informatics and director of the Arkansas Center for Genomic and Epidemiology Medicine at UAMS.

“At least one of the differences we found could be responsible for why the current virus is causing a pandemic while past strains of monkeypox viruses did not,” he said.

The team’s article notes that the current monkeypox virus outbreak is not only the largest known outbreak to date, the infections result in much different clinical and epidemiological features compared to previous outbreaks.

In July, the World Health Organization declared the monkeypox outbreak a global health emergency.

While the virus is not usually lethal, its genetic makeup is strikingly similar to smallpox, Ussery said, so health officials and researchers are monitoring it closely. Smallpox killed

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an estimated 300–500 million people in the 20th century before a vaccine campaign eradicated the virus by 1979.

“Monkeypox is 99.5% identical to smallpox,” Ussery said. “It is so closely related that if you are old enough to have been vaccinated for smallpox, you are likely protected against monkeypox.”

The research team’s findings are a starting point for additional investigation in the lab, he said. A follow-up study will be needed to identify the changed properties of the monkeypox virus and to test which mutations are responsible for the virus’ increased ability to spread.

Co-authors on the publication are:

- Visanu Wanchai, Ph.D., postdoctoral fellow, UAMS College of Medicine Department of Biomedical Informatics
- Trudy Wassenaar, Ph.D., a UAMS genomics consultant and frequent collaborator

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UAMS is the state's only health sciences university, with colleges of Medicine, Nursing, Pharmacy, Health Professions and Public Health; a graduate school; a hospital; a main campus in Little Rock; a Northwest Arkansas regional campus in Fayetteville; a statewide network of regional campuses; and seven institutes: the Winthrop P. Rockefeller Cancer Institute, Jackson T. Stephens Spine & Neurosciences Institute, Harvey & Bernice Jones Eye Institute, Psychiatric Research Institute, Donald W. Reynolds Institute on Aging, Translational Research Institute and Institute for Digital Health & Innovation. UAMS includes UAMS Health, a statewide health system that encompasses all of UAMS' clinical enterprise. UAMS is the only adult Level 1 trauma center in the state. UAMS has 3,047 students, 873 medical residents and fellows, and six dental residents. It is the state's largest public employer with more than 11,000 employees, including 1,200 physicians who provide care to patients at UAMS, its regional campuses, Arkansas Children's, the VA Medical Center and Baptist Health. Visit www.uams.edu or www.uamshealth.com. Find us on [Facebook](#), [Twitter](#), [YouTube](#) or [Instagram](#).

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