

Findings on adenoviruses in baby gelada monkeys provide a window into our own cold and flu season

New research shows that like human babies, the youngest gelada monkeys pick up the most viruses early in life

By Gabriela Harrod, ASU News
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If you have young kids or spend time around day care centers, you know the drill: Someone gets a cold, and soon the whole group is sniffing and sneezing. Now imagine that same pattern playing out in the highlands of Ethiopia among a crowd of wild monkeys.

That is exactly what a team of Arizona State University and Ethiopian researchers found when they [studied adenoviruses](#) in geladas, a close primate relative that lives in large social groups.

Adenoviruses were most common in babies under 3 years old who spend a lot of time playing with other babies.

“This is kind of that melting pot thing you see in a day care,” where many young bodies and hands mix together and viruses find routes to spread, said [India Schneider-Crease](#), assistant professor in ASU's School of Human Evolution and Social Change and a core faculty member of the Center for Evolution and Medicine.

Among young geladas, adenovirus infections were most common in babies younger than 6 months who spend more time with their moms than playing with other geladas. Gelada babies ride on their moms during busy days of grooming and mingling with other monkeys and probably pick up adenoviruses simply by being close to other social monkeys. By the time they start playing more with other babies, they have already developed immunity from this early exposure.

The research was possible because of years of fieldwork and collaboration with local Ethiopian scientists. They worked at a long-running gelada research site in the Simien Mountains National Park, Ethiopia, that has been tracking individual geladas since 2006. That allowed the team to collect 248 fecal samples from 43 known monkeys and assess adenovirus dynamics over infant development. They extracted DNA from these samples, assembled adenovirus genomes, and looked at each sample to see which were positive for any of the adenoviruses.

The result was 10 complete adenovirus genomes representing seven distinct lineages. Four of those lineages are so different that the team says they qualify as new species. In other words, there is still a lot of viral diversity out there that has not been catalogued. These new genomes were deposited in public databases so other scientists can use them for further study.

[Maya Saroff](#), the study's first author, was a Barrett, The Honors College undergraduate mentored by Schneider-Crease and ASU Professor [Arvind Varsani](#) when she worked on the project for her honors thesis while pursuing her bachelor's degree in biological sciences with a focus on genetics, cell and developmental biology.

To begin this research project, she said, "I picked adenoviruses and did a literature review."

She then worked with the Varsani lab to help complete genome annotation and wet lab follow up to assemble adenovirus genomes from the fecal data, and with the Schneider-Crease lab to contextualize the results in gelada ecology and behavior

Why babies are more vulnerable than adults

The team initially expected infections to peak when infants begin exploring and playing with other babies at about 6 months. Instead, the peak came earlier, while infants were still clinging to their mothers.

The likely explanation was not that mothers were sick, since adult infection rates were low. Rather, babies are indirectly in constant contact with other monkeys as their mothers groom and socialize.

Saroff pointed to a striking detail: The youngest infants also had the highest number of different adenoviruses at once.

Three adenoviruses was the highest number found in a single sample, she said, which was taken from one of the youngest geladas, who was just a few days old.

Seeing this co-infection of several adenovirus types in one tiny body shows that infants are especially vulnerable, and shows how early exposures may be important for immune development.

The study also found hints of a seasonal pattern. Higher adenovirus numbers were more likely to be found when temperatures were lower. The impact of ecology on behavior likely explains the connection.

In the colder wet seasons when grass is abundant, geladas stay close together while feeding, and babies may be able to play more. In hotter, drier seasons, groups spread out to find food, and there may be fewer opportunities for play. More play means more close contact and more opportunities for viruses to move between animals.

What this means on a human level

Wild primates give researchers a window into the evolutionary and ecological origins of our own immune systems. While we share many biological features with other primates, they are shorter-lived and mature faster than humans. This allows us to observe how viruses emerge, spread and resolve over a shorter time frame than if we only studied viruses in humans.

Understanding how social interactions shape health and disease in wild primates can help us understand how our own social lives shape our health.

“Studying these types of natural dynamics can provide that context for us,” Schneider-Crease said.

Working with wild primates rather than those in the laboratory also allows researchers to study how diseases naturally unfold. This team uses fecal samples because they are collected noninvasively, which makes it possible to build a large dataset without harming animals or altering their behavior.

There is also a conservation and public health aspect to this research. Finding new virus species highlights how little is known about the world’s viral diversity and why wildlife surveillance matters. Viruses evolve and the more we understand their natural diversity, the better we can anticipate future threats.

For anyone navigating cold and flu season, this study offers a reminder. Infants are naturally vulnerable and early exposures often help immune systems learn to fight pathogens. Maternal behavior and the environment also matter. Close contact and group settings make transmission easier, but having immunity from prior infections — or for humans, from vaccines that safely mimic those exposures — can mitigate infection later on.

As Saroff put it, studying these monkeys is “beyond cool for so many reasons.”

As cold and flu season continues, this study shows how behavior, ecology and life history shape viral dynamics and how early exposure may be the cost of building a stronger immune future.

This story originally appeared on [ASU News](#).

Main image



A baby gelada monkey clings to an adult gelada monkey. Photo courtesy of India Schneider-Crease

Text image(s)



India Schneider-Crease, courtesy photo



Maya Saroff, courtesy photo



A baby gelada monkey in Simien Mountains National Park, Ethiopia. Photo courtesy of India Schneider-Crease