with D-mannose on the surface of colonic epithelial cells for binding to type 1 pili (Fig. 1b). Bacteria that are unable to bind to host epithelial cells are cleared from the gut.

Could this molecule be used to combat UTIs? The authors reported that the M4284 administered to their mice facilitated clearance of UPEC bladder infection by directly interfering with the interactions between type 1 pili and urothelial cells in the bladder. Presumably, M4284 was absorbed into the bloodstream from the gut, and transported to the bladder. However, it is likely that a reduction in the density of UPEC in the intestine would also help to reduce UTI rates, by reducing the levels of UPEC available to colonize the urinary tract. Indeed, using a mouse model in which UPEC was introduced directly into the urinary tract, the researchers demonstrated that lower densities of UPEC in the gut resulted in lower rates of UTIs.

We are currently facing an antibiotic-resistance crisis, as acquisition of resistance by many pathogens outpaces the development of new antibiotics[6]. Spaulding and colleagues' findings, which point to a potential antibiotic-independent approach to reduce infections, are therefore welcome. Reducing adhesion of bacteria to host cells may provide new approaches to prevent, and even treat, UPEC infections[7].

Long experience and extensive study tell us that antibiotics inhibit not only pathogens but also the population of commensal bacteria in the gut. This microbiota provides a natural barrier to intestinal colonization by pathogenic bacteria, but the barrier can be compromised by antibiotic-mediated destruction of commensal microbes[8]. By contrast, anti-adhesion therapies that use small molecules such as M4284 might preserve the commensals. Encouragingly, Spaulding *et al.* did not observe any major changes in the gut microbiota following M4284 treatment. Nevertheless, as researchers study the mechanisms by which pathogens cling to our surfaces, they should also investigate how the harmless and health-promoting members of our microbiota remain in the gut. Only through this understanding will we be able to displace the troublemakers and keep the good guys around. ■

Hea-Jin Jung *and* **Eric G. Pamer** *are in the Immunology Program, Sloan Kettering Institute, Memorial Sloan Kettering Cancer Center, New York, New York 10065, USA.* **E.G.P.** *is also in the Infectious Diseases Service in the Department of Medicine and the Center for Microbes, Inflammation and Cancer, Memorial Sloan Kettering Cancer Center.*
e-mail: pamere@mskcc.org

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GENOMICS

The feline line

A study of ancient cat DNA that uses samples from different times and from around the world provides insights into the spread and evolution of these enigmatic creatures. Writing in *Nature Ecology & Evolution*, Ottoni *et al*. report their investigation of more than 200 cat remains and specimens, analysing a diverse range of material that included samples from 9,000-year-old bones, Egyptian cat mummies and modern African wildcats (C. Ottoni *et al*. *Nature Ecol. Evol*. http://dx.doi.org/10.1038/s41559-017-0139; 2017).

Their analysis indicates that the global spread of cats began in the Middle Eastern Neolithic (approximately 10,000 to 5,000 years ago). Dogs are thought to have been domesticated around 14,000 years ago (L. A. F. Frantz *et al. Science* **352,** 1228–1231; 2016). But, as befits their famed independence, cats lived alongside humans for thousands of years before becoming fully domesticated, and the authors note that early domesticated cats were probably bred as pest-control agents, not pets.

The authors identified two major cat lineages that contributed to modern domestic cats. One of these lineages first appeared in southwest Asia, spreading into Europe by 4400 BC. The other lineage, which comes from African cats, occurred mainly in Egypt, and was present in DNA samples from Egyptian cat mummies. In Ancient Egypt, the cat was a respected creature, and Egyptians worshipped a deity represented by a cat (pictured: a statue of the goddess Bastet). The African cat lineage spread throughout the Mediterranean along trade routes (perhaps because cats were kept on ships to control vermin) during the first millennium BC. **Luíseach Nic Eoin**

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