Journal Highlights

**DedA Proteins Essential in E. coli and B. burgdorferi; May Be New Family of Membrane Transporters**

Until recently, very little was known about the functions of the DedA membrane protein family, although homologs are present in most bacterial genomes, as well as the genomes of many archaea and eukaryotes. William T. Doerrler and colleagues of Louisiana State University, Baton Rouge, present evidence suggesting that DedA family proteins are necessary for proper maintenance of the membrane proton-motive force and may represent a new family of membrane transporters. They simultaneously deleted two of eight different DedA protein genes in *E. coli*. The resulting strain had cell division defects and temperature sensitivity. The envelope was stressed at permissive growth temperature, with reporter assays showing activation of four envelope stress pathways. The growth and cell division defects can be corrected by an acidic growth temperature, with reporter assays showing activation of four envelope stress pathways. The growth and cell division defects can be corrected by an acidic growth medium, or by overexpression of a gene that codes for an Na+/K+-H+ antiporter, says Doerrler. The team finds that DedA proteins are essential in *E. coli* and *B. burgdorferi* (the cause of Lyme disease), and “homologues in other organisms are necessary for virulence and/or resistance to cationic peptides,” says Doerrler. “The DedA family may represent a valid antibiotic target.”


**High-Tech Intravaginal Ring Could be Breakthrough in Anti-HIV Drug Delivery**

One of the holy grails of HIV research is development of a system for women to prevent their infection without using a condom. A recent clinical trial showed that a vaginal gel containing tenofovir reduced HIV infection rates by less than half. Those investigators think that the reason for the low success rate was the awkward dosing regimen before and after intercourse failed to maintain sufficient drug in the vaginal fluid. Now Patrick Kiser of the University of Utah, Salt Lake City, et al. have designed an intravaginal ring that can deliver 40 mg/day for 30 days or 10 mg for 90 days. The key, says Kiser, is rubbery polymers that can absorb water through nanoscale channels in the rubber. “The intravaginal ring is much smaller than 90 doses of a vaginal gel, it is also cheaper to manufacture,” says Kiser. The breakthrough is that the ring delivers large quantities of drug, steadily, over many days. “No one has shown that before,” says Kiser. A clinical trial is in the works.


**Iron Acquisition Balanced against Free Radical Toxicity**

Most bacteria need iron, and acquiring this element can be challenging, particularly for pathogens, which must compete with their hosts for the limited supplies within the body. Now Li Ma and Shelley Payne of the University of Texas, Austin, find that AhpC, a bacterial enzyme that detoxifies peroxides, has an unexpected role in iron metabolism in *Escherichia coli*. For the first time, Naomi Fast and Alex Ardila-Garcia of the University of British Columbia, Vancouver, Canada, characterize a (mild, chronic) microsporidian infection in a wild marine nematode. “The infection affects the muscle and hypodermal tissues of the host and appears to be transmitted from mother to offspring, via eggs,” says Fast. “The only previous confirmed case was that of a “nematode-killer” microsporidian that caused a lethal intestinal infection in a lab strain of *Caenorhabditis elegans.*” Our observation of *Sporonauta perivermis* [the newly characterized microsporidian] in its natural host demonstrated that the relationship between microsporidia and nematodes is considerably more complex and versatile in nature from that observed in the lab with the nematode killer.”


**First Characterization of Microsporidian Infection of Wild Nematode**

Nematodes are tiny animals that are arguably one of the most abundant animal groups. For the first time, Naomi Fast and Alex Ardila-Garcia of the University of British Columbia, Vancouver, Canada, characterize a (mild, chronic) microsporidian infection in a wild marine nematode. “The infection affects the muscle and hypodermal tissues of the host and appears to be transmitted from mother to offspring, via eggs,” says Fast. “The only previous confirmed case was that of a “nematode-killer” microsporidian that caused a lethal intestinal infection in a lab strain of *Caenorhabditis elegans.*” Our observation of *Sporonauta perivermis* [the newly characterized microsporidian] in its natural host demonstrated that the relationship between microsporidia and nematodes is considerably more complex and versatile in nature from that observed in the lab with the nematode killer.”