Gut Microbes 4:4, 265–266; July/August 2013; © 2013 Landes Bioscience

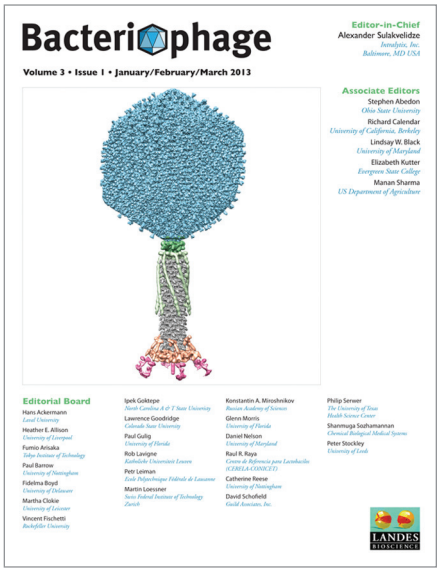
Landes Highlights

Bacteriophages for managing *Shigella*

The discovery of bacteriophages approximately 90 years ago initiated a new field of science in which these bacterial viruses were studied for their uses as antimicrobial agents. The practice became known as phage therapy, which is broadly defined as the use of phages to reduce or eliminate populations of bacteria in animals. More broadly, phage therapy also includes the use of phages to destroy bacteria on organic material destined for foods or inorganic surfaces such as food contact surfaces for example. The control of shigellosis in humans enjoys a prominent position in the history of bacteriophage therapy, since d'Herelle first demonstrated the efficacy of phage therapy by curing 4 patients of shigellosis, and several subsequent studies confirmed the ability of phages to reduce *Shigella* based infection. *Shigella* spp. continue to cause millions of illnesses and deaths each year and the use of phages to control the disease in humans and the spread of the bacteria within food and water could point the way forward to the effective management of an infectious disease with global influence. A recent review by Dr Lawrence Goodridge evaluates bacteriophages for managing Shigella in various clinical and non-clinical settings.

Reference

Goodridge LD. Bacteriophages for managing Shigella in various clinical and non-clinical settings. Bacteriophage 2013; 3:e25098; PMID:23819110



Emergence of more potent pathogens

Infectious diseases continue to plague the modern world, and human activities have collided with nature to hasten the emergence of more potent pathogens from natural microbial populations. A comprehensive control plan for emergent pathogens requires knowledge of the selective pressures imposed on natural microbial populations as well as the pathogenic mechanisms leading to the acquisition, expression and transmission of new virulence traits. Where did these pathogens come from? Why did they arise? What can be done to stop them? In a recent review, Dr Michael J Mahan and coworkers answer some of these questions by looking at recent infectious disease outbreaks, the events that led to their origin, and lessons learned: influenza (2009), meningitis (Africa, 2009), cholera (Haiti, 2010), *E. coli* (Germany, 2011) and *Salmonella* (USA, 2012). These outbreaks have severely impacted public health systems on local, national, and international scales and the lessons learned may shape health care globally for years to come.

Reference

Mahan MJ, Kubicek-Sutherland JZ, Heithoff DM. Rise of the microbes. Virulence 2013; 4:213-22; PMID:23334178; http://dx.doi.org/10.4161/viru.23380

Modulation of EHEC's virulence program in response to the host

Enteric pathogens must not only survive passage through the gastrointestinal tract but must also coordinate expression of virulence determinants in response to localized microenvironments with the host. Enterohemorrhagic *Escherichia coli* (EHEC), a serious food and waterborne human pathogen, is well equipped with an arsenal of molecular factors that allows it to survive passage through the gastrointestinal tract and successfully colonize the large intestine. A recent review by Dr Debora Barnett Foster explores how EHEC responds to various environmental cues associated with particular microenvironments within the host and how it employs these cues to modulate virulence factor expression. The review aims to develop a conceptual framework for understanding modulation of EHEC's virulence program in response to the host. While in vitro studies offer significant insights into the role of individual environmental cues, in vivo studies using animal models as well as data from natural infections will ultimately provide a more comprehensive picture of the highly regulated virulence program of this pathogen.

Reference

Barnett Foster D. Modulation of the enterohemorrhagic E. coli virulence program through the human gastrointestinal tract. Virulence 2013; 4:315-23; PMID:23552827; http://dx.doi.org/10.4161/viru.24318

Health economic evaluations of rotavirus vaccination

Two licensed vaccines are available to prevent rotavirus gastroenteritis in infants. In a recent critical literature review Dr Aurélie Millier and colleagues looked at 68 different studies on economic evaluations of these vaccines. Their objective was to describe differences in methodologies, assumptions and inputs and determine the key factors driving differences in conclusions. Rotavirus vaccination was found to be cost-effective in developing countries, while conclusions varied between studies in developed countries. Many studies found that vaccination was likely to be cost-effective under some scenarios, such as lower prices scenarios, inclusion of herd protection, and/or adoption of a societal perspective. Other reasons for variability included uncertainty around healthcare visits incidence and lack of consensus on quality of life (QoL) valuation for infants and caregivers. Dr Millier and colleagues concluded that new evidence on the vaccination effectiveness in real-world, new ways of modeling herd protection and assessments of QoL in children could help to more precisely define the conditions under which rotavirus vaccination would be cost-effective in developed countries.

Reference

Aballéa S, Millier A, Quilici S, Caroll S, Petrou S, Toumi M. A critical literature review of health economic evaluations of rotavirus vaccination. Hum Vaccin Immunother 2013; 9: In press; PMID:23571226