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IN BRIEF

VIRAL PATHOGENESIS

A small change makes a big difference

Prenatal Zika virus (ZIKV) infection has been linked to pregnancy complications and developmental defects, most notably microcephaly. The causal link between ZIKV infection and congenital brain abnormalities was first recognized in 2016; however, there is serological evidence that ZIKV has circulated for many years. A recent study found that current epidemic strains had become more neurovirulent compared with ancestral strains. To understand this difference, the authors compared the genome sequences of contemporary and ancestral strains and observed a number of amino acid substitutions. They constructed ancestral mutant viruses with these substitutions and found that a single serine-to-asparagine mutation in the viral prM protein enhanced infectivity in human and mouse neural progenitor cells, increased neurovirulence and led to more severe microcephaly in mice. The authors suggest that this single mutation led to the observed increased incidence of microcephaly in the recent ZIKV epidemic.

ORIGINAL ARTICLE Yuan, L. *et al.* A single mutation in the prM protein of Zika virus contributes to fetal microcephaly. *Science* **358**, 933–936 (2017)

HOST RESPONSE

Suppressing gut feelings

To maintain a healthy symbiotic relationship with gut bacteria, the host immune system must tolerate bacterial molecules. A number of host mechanisms have been reported to mediate this tolerance; however, bacterial mediators of host tolerance are still mostly unknown. Bacterial lipopolysaccharide (LPS) is a potent activator of host innate immune signalling via Toll-like receptor 4 (TLR4) pathways; however, antagonistic forms of LPS have recently been reported. In a new study, total LPS was purified from the gut microbiota and its immunostimulatory potential was assessed. Total purified LPS had a significantly lower stimulatory effect compared with LPS purified from *Escherichia coli*, demonstrating that total LPS has a limited capacity to activate innate immunity. Using metagenomics, the authors delineated strain level contributions to the LPS pool and found that members of the Bacteroidales, which are dominant members of the gut microbiota, produce antagonistic forms of LPS and thereby drive immune tolerance of the entire community.

ORIGINAL ARTICLE d'Hennezel, E. *et al.* Total lipopolysaccharide from the human gut microbiome silences Toll-like receptor signaling. *mSystems* **2**, e00046-17 (2017)

MICROBIOME

Fusobacterium persistence in colorectal cancer

Several studies have found that fusobacteria are enriched in human colorectal cancers. To investigate their role in human colorectal cancers, a recent study analysed the microbiome of patient colorectal tissue and metastatic tumours and observed that nearly identical *Fusobacterium* strains were present in the primary and metastatic tumours, indicating that fusobacteria may migrate with metastatic cancer cells. RNA *in situ* hybridization revealed that *Fusobacterium nucleatum* is predominantly localized with cancer cells within metastatic legions. *F. nucleatum* was also found after engrafting human cancer tissue into mice, and mice that were treated with an antibiotic were found to have less *F. nucleatum* and had a reduction in cancer cell proliferation and tumour growth, suggesting that antibiotics may be helpful in the treatment of fusobacteria-associated cancers.

ORIGINAL ARTICLE Bullman, S. *et al.* Analysis of *Fusobacterium* persistence and antibiotic response in colorectal cancer. *Science* http://dx.doi.org/10.1126/science.aal5240 (2017)