Mini-Review: 
Horizontal Transfer Trips up Classification, e24210

Classifying prokaryotes shouldn’t be too difficult of a task presuming the genes used as taxonomic markers are vertically inherited. However, it turns out that some of these genes can be transferred horizontally, making identification and classification a bit more tricky. In this mini-review, Kitahara and Miyazaki focus on the 16S rRNA gene and how it can be horizontally transferred between different species. See Figure 1.

[Figure 1. Panel (A) from Kitahara et al., e24210.]

Commentaries:

This Clone is Not Like the Other, e23463

Clonal bacterial groups should, in theory, have little to none genetic variation. Such is the nature of a clone. However, recent genome-wide studies have found that homologous recombination can create genetic variation in quite a few genes, and it can be significant. Weilong Hao describes these findings and expands on how knowledge of this variation can help us to understand how pathogenic variants arise.

Accumulating Male Mutations, e23462

The Y chromosome, while useful for sex determination in plants and animals, is prone to the accumulation of mutations and repetitive elements that can, over time, lead to gene loss. This phenomenon is known as Müller’s ratchet. VanBuren and Ming explore the X and Yh sex chromosomes of the papaya plant, focusing specifically on the processes that are slowly eroding the Yh chromosome.

Insertion Sequences Speed Up Evolution, e23498

One way to decrease the virulence of pathogens, such as Aeromonas salmonicida, is by the introduction of an insertion sequence into the genome. Recently, Tananka et al. showed that plasmid rearrangement, leading to a loss of the type three secretion system, was caused via recombination of insertion sequences on a specific plasmid. In this commentary, the authors note that other plasmid rearrangements do not fit this pattern. They also comment on the genetic instability driving the evolution of the genome of this bacterial fish pathogen.

Evolvability in Numbers, e23617

The ability to adapt to a stressful environment is critical to a microbe’s success. Many pathways exist that influence this adaptation and interestingly, these mechanisms can often be in conflict. Insertion sequences, a type of transposable element, normally have little effect on adaptive evolutions. However, Pál and Papp explain in this commentary how these elements can accumulate and exert an effect on bacterial evolution. See Figure 2.

How Long Have Transposable Elements Been With Us?, e23920

How long have transposable elements been hitching a ride in the mammalian genome? This is a difficult question to answer. Hellen and Brookfield attempt to answer this question by teasing out the time a transposon family enters the mammalian genome with how much genetic diversity it has accumulated. Their results support what the team calls the “life-cycle model” and sheds light on how much we can extrapolate genetic modifications by studying present day DNA.

The Magnetic Personality of LINEs, e24040

While many retrotansposons appear to have no deleterious effects on their host organisms, long interspersed nuclear elements (LINEs) can have deleterious effects if not suppressed. In this commentary, Del Re and Giorgi comment on a recent study that finds that extremely low frequency magnetic fields (ELF-MF), a
pervasive stimulus in the western world, may have an effect on LINE-1 activity in neuroblastomas. This makes ELF-MF a good candidate to help understand the effects of LINE-1 activity.

**Classifying Plasmids, e24263**

Classifying plasmids can be a tricky business. One way to detect and classify them is with the “Degenerate Primer MOB Typing” (DPMT), based on the MOB classification protocol. Garcillán-Barcia and de la Cruz explain how this method, along with PCR-based replicon typing, can help bring to light how these plasmids spread in microbial systems.