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PROGRAMME & ABSTRACTS

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In this proof-of-concept study, we identified several regions within the backbone pilin FctA (Spy0128) of a serotype M1 strain that can be replaced with the model peptide OVA\textsubscript{339-339} without affecting pilus assembly and display on the surface of L. lactis. Intranasal immunisation of mice with the resulting recombinant L. lactis strain produced strong Ova-specific antibody responses (IgG and IgA) in serum and bronchoalveolar fluid. Further exploration of the PilVax design has been carried out, including incorporating multiple peptides into the PilVax construct, and using structurally similar but antigenically different pilus type (from M18 serotype) as a platform. This research shows the potential of the PilVax technology for developing safe, effective and inexpensive peptide vaccines for mucosal delivery.

### Transcriptome analysis of Listeria monocytogenes exposed to a lethal concentration of nisin

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The persistence of Listeria monocytogenes can be defined by the prolonged viability of L. monocytogenes following antimicrobial treatment. This poses a risk to food safety. Persister cells of L. monocytogenes isolated from a food environment and exposed to lethal concentrations of nisin was used for this experiment. The persister cells had not acquired resistance as they were re-grow to a new population that resulted in a similar proportion of persister cells surviving following nisin treatment as seen in the original culture. The transcriptome of the persister cells from this L. monocytogenes food strain was compared with the original population. Hundreds of differentially expressed genes were identified, and subsequent analysis suggested that many biological processes such as cell wall synthesis, ATP-binding cassette transportation, and phosphotransferase system, were involved in the response of L. monocytogenes to nisin treatment. This helps us to understand the response of bacteria to long-term environmental stress.

### Can cooperation within the vaginal microbiome lead to the development of bacterial vaginosis?

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Despite being a controversial topic over the past few decades, Gardnerella vaginalis has been attributed a central role in bacterial vaginosis (BV) development. An important milestone in BV research was the discovery that the different species involved in BV were associated in a structured polymicrobial biofilm, dominated by G. vaginalis. Subsequent studies demonstrated that G. vaginalis biofilms display a high resistance to the protective mechanisms of normal vaginal microflora, as well as an increased tolerance to antibiotics. Despite the increased evidence of the pivotal role of G. vaginalis in BV biofilm development, the importance of the other BV-associated anaerobes should not be neglected.

There are some observational studies that correlate bacterial co-colonization between G. vaginalis and some other specific BV-associated bacteria during BV. Furthermore, synergistic interactions can occur between BV-associated species and G. vaginalis, leading to increased biofilm formation in dual-species biofilms. We hypothesized that differential bacterial interactions can occur during BV development. To test our hypothesis, we examined the ecological interactions between G. vaginalis and other 15 BV-associated anaerobes that we had previously shown to enhance biofilm formation by G. vaginalis, using a dual-species biofilm model. Bacterial distribution and biofilm structure were evaluated by peptide nucleic acid fluorescence in situ hybridization (PNA FISH) method and confocal laser scanning microscopy analysis. Furthermore, the bacterial coaggregation ability was determined as well as the gene expression of virulence genes. The total biomass and the bacterial populations of dual-species biofilms were also quantified, using the crystal violet and PNA FISH methods, respectively.

Our results revealed distinct dual-species structures, between the different consortia, with at least 3 unique biofilm morphotypes. Many, but not all consortia, revealed an induction of G. vaginalis genes associated to cytotoxicity, biofilm formation, antimicrobial resistance and immune response.

Overall, this important research contributes to our understanding of how multi-species biofilms contribute to the development of BV. Importantly, the detected specific molecular interactions were very specific to each consortium, suggesting that not all BV-secondary anaerobes contribute to enhanced virulence.

### Damage to disaster: Cause and effect of tail fan necrosis in spiny lobsters

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Tail fan necrosis (TFN) is a disorder commonly found in some populations of commercially fished and aquacultured lobsters. The unsightly appearance of affected lobster tails not only dramatically lowers the commercial value of the...