

## ADVISORY COMMITTEE ON THE MICROBIOLOGICAL SAFETY OF FOOD

**Studying the gut microbiome in food animals**

Following the discussion the Committee had at its January 2016 meeting on the outcome of the workshop on the human gut microbiome the Defra representative agreed to liaise with the Animal and Plant Health Agency (APHA) to provide information on their work on the animal microbiome. Dr Muna Anjum, Department of Bacteriology, APHA, has been invited to the meeting and has provided the following abstract of her presentation.

1. Metagenomics is a powerful tool that can be applied to study the gut microbiota and any changes that occur to it. It can be used to study genes present as well as the microbial diversity in the gut. At the APHA we have used it as a “diagnostic tool” for detecting bacterial pathogens and the possible changes that can occur in the microbiota of pigs with dysentery, in comparison to healthy pigs. In future, as the cost of performing metagenomics decreases this method could be utilised routinely for diagnosis of infectious agents directly from faeces, especially for fastidious organisms such as *Brachyspira* which grow slowly using traditional microbiology.
2. We have also used microbial profiling and other tools in an *in-vitro* chicken gut model to see the effect on microbial diversity in the chicken gut microbiota, following infection with an ESBL *S. Typhimurium*, and intervention with antibiotics. Our results show that infection with an ESBL *S. Typhimurium* may not affect the microbial profile as antibiotics does, but it will enable transmission of an ESBL plasmid to other gut bacteria. In future, the *in-vitro* gut model which the APHA has available, can be used as a cheaper alternative, prior to animal studies, to trial possible interventions which control food borne zoonotic pathogens that may be multidrug resistant, passing through the food chain. For such studies metagenomics can be used as an adjunct to other techniques to monitor changes to the microbiota as a result of infection and any intervention.

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