

## Host Pathogen interactions

### Functional Genomics

Food safety and the quality of food are an important issue on which the nature of host pathogen interactions can have a great impact. The nature of the interactions between host (e.g. pig) and microbe (pathogen; e.g. salmonella) determines the outcome of the contact between host and microbe: for example, elimination of the microbe, colonization of the microbe causing disease, but also colonization without causing disease. Several specific host-pathogen relationships receive special attention in the EADGENE Joint Research Programme, where, among others, groups of scientists from several laboratories are working around specific subjects using so-called 'functional genomics' approaches. Functional genomics is the analysis of the function of the genes of an organism. The group focuses on pathogens that can form a threat for the safety and quality of food derived from cattle, swine, chicken and/or Atlantic salmon.

The main objectives of the groups are:

- To identify the host genes involved in host-pathogens interactions. *e.g. a pig, cow or fish*)
- To identify the genes of the pathogen that are involved in host-pathogen interactions *animal pathogens (e.g. micro-organisms causing salmonella)*
- To find out how the products of the host genes work together and how they determine the quality of the animal's response to an infection, and how they determine the outcome of an infection
- To find out how the products of the genes of the pathogen work together and how they determine the virulence of a pathogen in an animal host
- Trying to get insight into the molecular basis of the variation in host response and the variation of host with regard to their susceptibility for an infectious disease.

Currently there are four pathogenic and/or zoonotic (infectious for animal as well as human) microorganisms on the EADGENE priority list: Salmonella, Mastitis, *E. coli* followed by Fish pathogen and Campylobacter. The work is according to this divided into working groups. These groups exchange experimental data and resources and study and compare the "dialogue" between host and pathogen on a molecular level.

This research generates fundamental knowledge on host-pathogen interactions and offers avenues to develop new tools and strategies to enhance disease resistance, to develop new intervention strategies, and to develop better diagnostics.