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Breeding for genetic resistance to disease

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Animal health issues are of increasing importance to all animal breeding sectors, including poultry, by raising health and welfare issues and causing major production costs, but also to citizens, by affecting possibly their own health and lifestyle choices. So far, traditional selective breeding approaches have been applied successfully by poultry breeders to enhance production and reproduction traits; but the inclusion of animal health related traits are scarcely considered because of a clear lack of easy measurable and relevant phenotypes and associated genetic markers which could be integrated in running breeding programs. Though, there have been numerous studies in the past showing

evidence of genetic variability of responses to various diseases of economic interest, like parasitic, bacterial or viral diseases. New opportunities have been arising thanks to major advances in animal genomics and related technologies. Most research strategies are now developed, combining structural, population and functional genomics approaches. The objective of the running studies is two-fold: **1** - identification of genes, gene products and regulatory networks involved in host pathogen interactions which could be used in selection and **2** - better understanding their functions and the underlying mechanisms. Also, there is a growing interest in deciphering genetic parameters underlying the immune response (innate and adaptive) of chickens and how this can be applied to breeding. Thus, research and development aiming at understanding and implementing host genetic variation in disease resistance requires large use of field data, collaborative multidisciplinary programs and efficient technology transfer between research and industry. But breeding for disease resistance will be always a balancing act, the ultimate goal being "robust" animals for a sustainable production in fluctuating environments.