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### Microbiome and antioxidant system of the gut in chicken: Food for thoughts

The microbiome of the gastrointestinal tract in poultry is one of the major factors affecting health of birds (especially the immune system), their productivity and period of productive use. Furthermore, pathogens and agents of food toxicoinfections in humans (e.g. campylobacteriosis) may result from contamination of eggs and meat with bacteria that are normal in the gastrointestinal tract of poultry. There is also an antioxidant-prooxidant balance in the gut that interacts with microbial population and determines gut integrity and inflammation. Our studies indicate that superoxide dismutase and heat shock proteins are major protective mechanisms in the gut, while mycotoxins and oxidized fat in the diet represent negative effectors of gut health. We find that by using vitagene-activating supplements it is possible to improve feed conversion ratio in growing chickens and layers due to improvement of gut antioxidant/redox status and health. Intestinal microflora impact on egg production and meat quality has not been studied well using molecular genetics and genomic techniques in relation to feed additives (e.g. probiotics, anti-stress additives, etc.) that should be safe for human. Neoteric metagenomic profiling of bacterial communities using T-RFLP, RT-PCR and NGS technology provides a powerful toolbox for monitoring intestinal microflora at all stages of chicken development and performance. Combined with gene expression analysis in the chicken guts, microbiome studies can aid in understanding of

nutritional, microbiologic and genetic factors forming poultry health and productivity, and in improving biosafety and quality of poultry products. It seems likely that pathogenic bacteria and prooxidants are on one side of the balance while antioxidants, probiotics and normoflora are on the other side of the balance determining chicken health and their productive and reproductive performance. Understanding this balance is a new promising direction of the research.

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#### Biography

Peter F Surai has his expertise in animal and human nutrition and published a number of papers as well as two books ("Natural Antioxidants in Avian Nutrition and Reproduction", 2002; and "Selenium in Nutrition and Health", 2006) which became textbooks for animal nutritionists. His recent research is devoted to the development of effective strategies to fight commercially relevant stresses in livestock/animal production. He successfully transferred vitagene concept from Medical Sciences (Calabrese et al., 2007-2016) to Animal and Poultry Science and developed stress-prevention programs based on supplying vitagene-regulating nutrients to farm animals via drinking water. He held Honorary Professorships in Nutritional Biochemistry at various universities in the UK, Hungary, Bulgaria and Ukraine, and became a Foreign Member of Russian Academy of Sciences. For the last 15 years he has been lecturing all over the world visiting more than 70 countries.

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