

CPRC Update

POULTRY SCIENCE CLUSTER

The results are in

Research activities under the first Canadian Poultry Science Cluster officially ended March 31, 2013. Below is a quick overview of the scope of the Cluster project with highlights of its outcomes. For more details, search for “Cluster” on our website, www.cp-rc.ca, or please feel free to contact us directly.

The term “Cluster” is used to describe an approach to science that encourages researchers to work together to reach common goals. The Poultry Science Cluster was formed to address a number of research goals identified by the industry. Research within the Cluster spanned the “innovation continuum” from basic discovery to practical application. It encompassed 10 core activities involving 21 principal scientists at seven university and government research institutions across the country. This research contributed to training and professional development of over 40 students, postdoctoral fellows and visiting scientists. Technical information resulting from this research has been shared with the research community through peer-reviewed publications and scientific meetings. Practical information has been shared with industry stakeholders. A number of patent applications and invention disclosures are a direct result of activities within the Cluster.

Here are a few highlights of the results from this work:

- A new understanding of the biology *C. perfringens*, a bacterium associated with necrotic enteritis (NE) in poultry; in order to cause NE, a *C. perfringens* strain must have a specific genetic make-up that includes certain genes in its chromosomes and others found on plasmids that can be passed from one bacterium to another. Strains of *C. perfringens* that have acquired the right sets of genes have a competitive advantage in the gut and, when conditions are right, are primed to cause disease.
- Progress towards an improved vaccine against *Salmonella* Enteritidis, the design and delivery of which is hoped to simultaneously reduce colonization in the gut of laying hens and prevent spreading infection throughout a flock and potentially on to consumers.
- Demonstration that plant-based essential oils can be used to fight bacterial infections in poultry; encapsulated oils were able to protect birds from NE just as well as dietary antibiotics.
- A new understanding of how avian influenza (AI) virus adapts to and causes disease in modern poultry, including identification of a genetic determinant that “switches” AI virus from low to high pathogenicity
- Demonstration that airborne transmission could play a role in the spread of AI infection, and that only very small amount of virus is needed to transmit the disease by indirect contact.
- New information on the bird’s immune reaction to AI infection.
- A prototype virosome-based vaccine that elicits broad immune responses thought to be necessary for adequate protection from AI infection.
- Demonstration that specific compounds (adjuvants) can be combined with the virosome vaccine to further improve immune responses.
- Development of a vaccine vector system (based on avirulent fowl adenovirus) that can be engineered to carry genes coding for specific antigens, and demonstration that it can be used elicit appropriate immune responses upon *in ovo* (in the egg) injection.
- Progress towards development of a turkey adenovirus-based vector system

- Development of a DNA-based vaccine that, using a specific administration route, can protect poultry from a highly pathogenic AI virus.
- Demonstration that inclusion of a vitamin D precursor (HyD) in turkey diets, particularly early in life, has beneficial effects on meat yield and early immune function. The study suggests that industry-recommended HyD levels can be reduced by as much as 50% after six weeks of age without loss of benefit thereby reducing production costs.
- Confirmation that diets containing fibre supplements and/or appetite suppressants may be a viable solution to prevent chronic hunger in feed-restricted broiler breeders.
- Demonstration that toe trimming represents a potential welfare improvement for female turkeys, but the practice may not be beneficial for males.

While the Cluster is officially complete, research related to many of its initiatives are ongoing and moving to 'next steps'. We'll keep you posted on future progress.

For more details on these or any other CPRC activities, please contact The Canadian Poultry Research Council, 350 Sparks Street, Suite 1007, Ottawa, Ontario, K1R 7S8, phone: (613) 566-5916, fax: (613) 241-5999, email: info@cp-rc.ca, or visit us at www.cp-rc.ca.

The membership of the CPRC consists of Chicken Farmers of Canada, Canadian Hatching Egg Producers, Turkey Farmers of Canada, Egg Farmers of Canada and the Canadian Poultry and Egg Processors' Council. CPRC's mission is to address its members' needs through dynamic leadership in the creation and implementation of programs for poultry research in Canada, which may also include societal concerns.