

Technology Licensing Opportunity

Non-Confidential Summary



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ENHANCEMENT OF IMMUNOPROTECTIVE EFFECTS OF OLIGODEOXYNUCLEOTIDES CONTAINING CPG-MOTIFS BY FORMULATING WITH CARBON NANOTUBES AND OTHER LIPID BASED FORMULATIONS IN POULTRY

ROI# 11-029

Opportunity:

Researchers at the University of Saskatchewan have developed a new method to enhance immunoprotective function in poultry. This method consists of combining oligodeoxynucleotides containing CpG-motifs (CpG-ODN) with lipid-based formulations and/or carbon nanotubes.

Background:

[The Poultry Site](#) lists about 140 avian infectious diseases. Chicken mortality rate ranges from 5-20% on different farms. Immunosuppression could be triggered not only by avian pathogens but also by stress and poor health management practices on the farm. The negative impact of immunosuppression makes it difficult for the poultry industry to process chickens due to the related health problems. It becomes very important to maintain immune status of chickens especially neonatal birds at reasonable costs. Practice of prophylactic use of antibiotics, while commonplace, is controversial because it encourages the emergence of antibiotic resistant microbes, and may result in food allergies and soil or water contamination via fecal excretion of antibiotics in poultry manure applied to the land. The emergence and rising spread of resistant bacteria are rendering current antibiotics progressively less useful. Thus, there is pressure to restrict the use of antibiotics in agriculture and to implement alternative strategies for disease control. This has become increasingly important due to a number of food safety and human health issues. In addition to the emergence of antibiotic resistant bacteria, the issue of drug residues in meat products is important, both for domestic and international trade. For these reasons, the animal production industry is seeking to reduce the use of therapeutic agents by developing effective immunotherapeutic agents.

Technology benefits:

- Increased neonatal broiler chicken survival against common bacterial pathogens.
- Better growth of broiler chickens by modulating innate immunity of neonatal broiler chickens.
- Non-toxic lipid based delivery systems and carbon nanotube based delivery systems
- Convenient *in ovo* delivery
- Novel formulations significantly increase the immunoprotective effect of CpG-ODNs due to synergism and this will lead to an increase in the duration of the activity of CpG-ODN.

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Researcher profile:

Dr. Susantha Gomis

Professor, Dept. of Veterinary Pathology, WCVN

Research interests: Basic and applied aspects of pathogenesis and control of viral and bacterial diseases in poultry and mammalian species.

Patent Status:

PCT patent application no. PCT/CA2013/000190 was filed on 3/6/2013

Relevant Publications:

Bhat A., Gomis S., Potter A. and Tikoo S. Role of Hsp90 in CpG-ODN mediated immunostimulation in avian macrophages. *Molecular Immunology* 47(6): 1337-1346, 2010.

Gomis S., Babiuk L., Allan B., Willson P., Waters E., Ambrose N., Hecker R. and Potter A. Protection of Neonatal Chicks Against a Lethal Challenge of *Escherichia coli* Using DNA Containing Cytosine-Phosphodiester-Guanine Motifs. *Avian Diseases* 48(4):813-22. 2004

Taghavi A., Allan B., Mutwiri G., Van Kassel A., Willson P., Babiuk L., Potter A., and Gomis S. Protection of Neonatal Broiler Chicks Against *Salmonella* Typhimurium Septicemia by DNA Containing CpG Motifs. *Avian Diseases* 52(3):398-406. 2008

Gomis S., Babiuk L., Godson D.L., Allan B., Willson P., Thrush T., Townsend H., Willson P., Waters E., Ambrose N., Hecker R. and Potter A. Protection of Chickens against *Escherichia coli* Infections by DNA Containing CpG Motifs. *Infect.immun* 71 (2): 857-63. 2003

Development Stage:

Technology is ready for licensing to a commercial partner.

For more information, please contact:

Oksana Akhova, PhD, MBA
Tel. (306) 966-5496
oksana.akhova@usask.ca

Industry Liaison Office
121 Research Drive, Suite 501
Saskatoon, SK, S7N 1K2
Tel: (306) 966-1465 | Fax: (306) 966-7806