Advancing our industry through evidence-based research

Research summary overview

Our Research Grant Program actively supports research projects in a variety of fields at universities across Canada. Each research project is linked to at least one of Egg Farmers of Canada's research priorities. Below is an introduction to these research projects as well as their status.

2021 EFC GRANT PROGRAM RESEARCH SUMMARY

PROJECT NAME	PAGE	RESEARCH PRIORITY AREA ADDRESSED								
		Animal care science	Food safety	Human nutrition and health	End of flock management	Innovative uses of eggs	Environment and sustainability	Bird nutrition and health	Public policy and economics	Research gaps identified by the Code of Practice
Determining the impact of gizzard size on feed efficiency, gut health, and the incidence of focal duodenal necrosis in pullets and layers fed diets with different calcium sources and levels	4							X		
Effect of finishing space allowance in standard and enriched colony systems on performance, health and welfare of layer pullets	5	X								
Investigating the role of limestone particle size on skeletal development and performance of pullets reared in conventional and aviary housing systems and subsequent performance, bone health, calcium metabolism and welfare of hens housed in enriched colony systems	5							X		

EGG FARMERS OF CANADA

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		Animal care science	Food safety	Human nutrition and health	End of flock management	Innovative uses of eggs	Environment and sustainability	Bird nutrition and health	Public policy and economics	Research gaps identified by the Code of Practice
Prevalence of focal duodenal necrosis in Saskatchewan layer flocks and its effect on egg production	6							X		
Circular economy: application to egg production in Canada	6						X		X	
A novel egg white-based biomaterial for 3D tissue engineering	7			X		X				
Understanding feather pecking in laying hens: the gut-microbiome-brain connection	7	X								
Precision feeding layers for improved uniformity and production and sustainability	8							X		
The role of shell protein in controlling bacterial movement through laying hen eggs	8		X							
Investigating the influence of a range of exposure conditions during simulated transport on pullet and end-of-lay physiology, welfare and meat quality	8				X					
Development of strategies for control of avian influenza virus transmission	8							X		
Egg production for a complete cycle feeding of dietary seaweed	8		X							
The role of omega-3 fatty acids in bone development in pullets: investigating epigenomic response to breeder and perinatal nutrition	9							X		
Eggshell membrane nano-particles for biomedical applications	9					X				
Cuticle proteins in diverse lines of hens	9		X							
How much omega-3 fatty acids do hens require for optimal health and productivity?	9							X		
A novel non-antibiotic strategy for controlling avian pathogenic *Escherichia coli* in laying hens	9							X		X
Importance of eggshell cuticle quality for reducing bacterial adherence in table eggs	9		X							
Assessment of the impact of Canadian infectious bronchitis virus variants on egg production and fertility in laying hens	10							X		X
Determination of the metabolic triggers responsible for sexual maturation in laying hens and their relation to rearing environment and nutrition	10							X		X
Egg yolk lecithin supplementation to improve pulmonary health: implications for healthy individuals and individuals with Chronic Obstructive Pulmonary Disease	10			X						

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		Animal care science	Food safety	Human nutrition and health	End of flock management	Innovative uses of eggs	Environment and sustainability	Bird nutrition and health	Public policy and economics	Research gaps identified by the Code of Practice
Develop new application of egg protein ovotransferrin as a functional food ingredient for bone health	10			X		X				
Modified eggshell membrane formulations as a novel supplement to maintain gut health	10			X		X				
Optimization of vaccination strategies for table egg layers controlling egg production problems induced by currently circulating infectious bronchitis virus variants	11							X		X
The fermentation of spent hen hydrolysate to produce pathogen free microbiological rich plant nutrient solutions	11				X					
The beneficial effect of egg-derived phosphatidylcholine on the obesity-related immune dysfunction	11			X						
Get cracking for diabetes: an egg-based breakfast for improving blood glucose control in type 2 diabetes	11			X						
Animal implant studies with nano-textured eggshell-based constructs for bone regeneration	12			X		X				
Use of 3D kinematics and genomics to evaluate perching biomechanics in commercial and heritage strains of enriched-housed pullets and laying hens	12	X								X
Mining the hen gastrointestinal microbiome for novel anti-infective probiotics to reduce the incidence of bacterial infections	12							X		
Impact of alternative housing systems on layer health and egg production	12	X						X		
Egg as a strategy to maintain retina health in people with diabetes	13			X						
Functional feedstuffs to bolster performance and immunocompetence of pullets reared at different rearing densities in enriched colony systems	13							X		X
Egg white-alginate based biomaterial for 3D tissue engineering	13					X				
Development of novel and alternative approaches using small-RNA based immune-stimulant molecules for control of avian infectious bronchitis virus	13							X		
Impact on metabolic health of new ingredients enriched with active components derived from egg yolk	13			X		X				
Understanding the social representations of meat, eggs and animal proteins replacement products and their impact on food habits	14								X	

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		Animal care science	Food safety	Human nutrition and health	End of flock management	Innovative uses of eggs	Environment and sustainability	Bird nutrition and health	Public policy and economics	Research gaps identified by the Code of Practice
Whole eggs for reducing inflammation and promoting muscle repair in adults with obesity	14			X						
Surveillance of egg yolk peritonitis and causative *Escherichia coli* in Alberta egg farms	14							X		
Accelerating speed to market of an egg-derived natural health product: clinical efficacy and safety assessment of egg peptides in the management of high blood pressure	14			X		X				
Precision pullet rearing strategies for optimal reproductive body condition	14							X		X
Optimization of environmental and hen welfare outcomes in Canadian egg production using predictive analytics (machine learning) techniques	15						X			
Determination of ideal perch space allowance for pullets	15	X								X
The role of eggs in improving choline and DHA nutrition during development	15			X						
Sustainable composites from waste eggshells for practical applications	15					X	X			
Assessing hatchery related well-being	16	X								X
Effect of LED flicker on the welfare, health, and production of pullets reared to 16 weeks and further impacts on hen performance and egg production and quality	16	X								

Completed research 2019–2020

Determining the impact of gizzard size on feed efficiency, gut health and the incidence of focal duodenal necrosis in pullets and layers fed diets with different calcium sources and levels

Dr. Henry Classen, University of Saskatchewan

Objective

Investigate the incidence of focal duodenal necrosis (FDN) in pullet and layer flocks throughout production and compare the effects of providing a pre-lay ration for one week versus four weeks on gastrointestinal and production parameters and FDN occurrence.

Determine if calcium source and level has an impact on gizzard size, gut health, feed efficiency, production and the occurrence of FDN in pullets and laying hens.

Results

Pullet diet, calcium source or calcium level did not have an impact on egg production, feed intake, feed efficiency or bird mortality. Calcium source and level did not impact gizzard size or the pH of the gizzard and duodenum. Lesions caused by FDN were not identified until after 62 weeks of age, which was more prevalent in birds fed higher-than-recommended levels of calcium. Clostridium perfringens was found in FDN positive duodenal samples, which further supports that it may contribute to FDN. Additional research is needed to understand the pathogenesis of FDN in laying hens.

Effect of finishing space allowance in standard and enriched colony systems on performance, health and welfare of layer pullets

Dr. Tina Widowski, University of Guelph

Objective

Determine the effects of finishing space allowance in conventional and enriched colony rearing systems on growth, feeding behaviour and welfare of growing pullets and their subsequent performance in the layer barn in both research and commercial barns. Data from this project will support the development of best practices for rearing and management of pullets.

Results

The results from pullets reared in conventional housing systems suggests that optimal rearing density depends on strain and farm management. The results from pullets reared in enriched colony housing systems demonstrated that rearing density had little impact on growth and musculoskeletal development during rearing and subsequently had no impact on laying hens. However, as stocking density increased, activity and locomotion rates were significantly lower compared to pullets reared in low stocking densities. Feather pecking rates were not impacted by stocking density in enriched colony housing systems, which may be due to the presence of perches. Pullets reared in higher stocking density systems had dirtier plumage than birds in lower stocking density systems; however, in general, pullets had good feather cover, foot health, and keel condition at 16 weeks of age. Density did not affect laying performance, egg weights, foot health, keel bone health or feather condition scores. Strain differences in keel bone development were noticed, which may lead to differences in keel bone damage in hens.

Investigating the role of limestone particle size on skeletal development and performance of pullets reared in conventional and aviary housing, and subsequent performance, bone health, calcium, metabolism and welfare of hens in enriched colony housing

Dr. Elijah Kiarie, University of Guelph

Objective

Evaluate the effects of limestone particle size on calcium digestibility and metabolism in laying hens and pullets, and the performance and skeletal development of pullets reared in different housing systems. This research will follow pullets through to the laying phase and assess the subsequent effects of limestone particle size on egg mass, quality and internal characteristics, bone health and welfare in hens housed in enriched colonies. This research explores nutritional means to enhance gut health and function, skeletal integrity and to optimize feed utilization in pullets and laying hens.

Results

Pullets reared in enriched colony housing systems, or at a lower stocking density, had superior bone quality, improved egg production, egg weight, and eggshell quality compared to pullets reared in conventional systems. Pullets reared in both conventional and enriched colony

housing systems had improved bone quality and reduced keel bone damage that continued into lay when provided a mixture of limestone particle sizes. However, the researchers noted the need for post-peak production interventions to reduce the incidence of keel bone damage in lay. Ultimately, this project demonstrated that rearing system and dietary mineral manipulations may be an effective strategy to mitigate skeletal deterioration induced by egg laying and system injuries.

Prevalence of focal duodenal necrosis in Saskatchewan layer flocks and its effect on egg production

Dr. Henry Classen, University of Saskatchewan

Objective

Perform surveillance and data collection on eight laying hen flocks in Saskatchewan to determine the prevalence of focal duodenal necrosis (FDN), an intestinal condition of laying hens associated with decreased egg weight and egg production, and its effect on egg production. Identify factors associated with increased incidence of FDN and determine if clostridial organisms are associated with FDN lesions in the gut. This research serves to gain a better understanding of the scientific literature on FDN in laying hens, and direct further investigation into the etiology of FDN.

Results

Overall, FDN was found in seven of the eight flocks surveyed from 15-70 weeks of age. The earliest detection of FDN was at 20 weeks of age, and appeared to peak at 35 weeks of age. Strain, flock size, housing system, intestinal measurements, or nutrients were not found to have a significant impact on FDN in laying hens. While egg weight and size were not impacted by flocks with FDN, there was a correlation between FDN and downgraded eggs at peak production. *Clostridium perfringens* was found in 17.6% of FDN lesions, suggesting that FDN is a multifactorial concern rather than the main cause.

Circular economy: application to egg production in Canada

Dr. Maurice Doyon, Université Laval

Objective

Circular economy is aimed at minimizing resources used in production and identifying ways to redirect byproducts and waste to recycling in production and in other industries. This research project aimed to develop and evaluate quantifiable and objective circular economy indicators for egg production and recommend ways of improving their circularity level. Indicators were quantified on commercial farms.

Results

The researchers identified 25 circular economy indicators and 14 measures to address these indicators on-farm. The top five indicators identified were feed conversion rates, average laying rate, amount of time between flock cycles, total amount of direct energy used, and strategies and practices to reduce power consumption. Measures to address these indicators included aiming for feed conversion rates <1.71kg (conventional housing) and <2.08kg (alternative housing) of feed/kg of eggs; aiming for a lay rate >92% (conventional) and >89% (alternative); reducing energy used to under 218 (conventional) and 367 (alternative) kWh/tonne of eggs produced; and reducing power consumption with zero energy buildings and LED lighting. Ultimately, the researchers developed a tool that egg farmers can use to reduce their environmental impact and improve their circular economy on-farm. Transitioning to a circular economy would enable farms to reduce their environmental impact.

A novel egg white-based biomaterial for 3D tissue engineering

Dr. Simon Tran, McGill University

Objective

Characterize the use of egg white alginate as a novel scaffold to grow a number of different organoids including salivary glands. Egg white alginate is an inexpensive, easily accessible and promising alternative to gold standard scaffolds.

Results

The results of this project suggest that egg white alginate is a promising, sustainable, and affordable scaffold suitable for organoid cultures. The researchers continue to investigate and improve egg white-based alginate as a novel scaffold. EFC continues to support Dr. Tran's research on the use of egg white-based biomaterial for the purpose of 3D tissue engineering.

Understanding feather pecking in laying hens: the gut-microbiome-brain connection

Dr. Alexandra Harlander, University of Guelph

Objective

Test if social stress induced by large, densely populated groups of laying hens in free run systems contributes to feather pecking or influences changes in gut microbiota, immune system, enteric nervous system or metabolic pathways. Assess whether changes in gut microbiota and their metabolites alter specific pathways, and if these mechanisms contribute to feather pecking.

Results

Birds that performed a higher amount of feather pecking behaviour were more sensitive to social stress and had different concentrations of amino acid, metabolites, and gut microbiota compositions compared to low feather pecking hens. Supplementing birds with *Lactobacillus* had a positive impact on the birds gut, stress-induced behavioural responses (including feather pecking), and their immunity. The results from this project help the poultry industry further understand feather pecking, and may result in promising solutions that reduce the incidence of feather pecking.

Research in progress

Precision feeding layers for improved uniformity, production and sustainability

Dr. Martin Zuidhof, University of Alberta

Objective

Use precision feeding to improve the uniformity of free run pullets and laying hens by feeding through an optimal diet based on real-time body weight readings and reducing body size and frame size variation at the point of sexual maturity.

The role of shell protein in controlling bacterial movement through laying hen eggs

Dr. Bruce Rathgeber, Dalhousie University

Objective

Assess the presence of antimicrobial proteins in eggshells from a wide range of genetic backgrounds to determine if the increased protection from *Salmonella* penetration in some hens is related to increased presence of antibacterial proteins in the eggshell.

Investigating the influence of a range of exposure conditions during simulated transport on pullet and end of lay physiology, welfare and meat quality

Dr. Karen Schwean-Lardner, University of Saskatchewan

Objective

Investigate the response of pullets and end of lay hens to a range of exposure conditions, durations and feather covers during simulated transport. Data from this project will support the development of evidence-based transportation limits for pullets and end of lay hens in regulations and Codes of Practice.

Development of strategies for control of avian influenza virus transmission

Dr. Shayan Sharif, University of Guelph

Objective

Develop vaccine formulations that can effectively control avian influenza (AI) virus shedding and can be administered in-ovo or in feed, water or spray. The mucosal delivery vaccine platform that will be established in this research could be used for other types of poultry vaccines. This research will combine expertise in vaccine development and computer modelling to model the transmission of AI from vaccinated poultry to susceptible poultry, and create a decision support system for the management of AI.

Egg production for a complete cycle feeding of dietary seaweed

Dr. Bruce Rathgeber, Dalhousie University

Objective

Evaluate the use of dietary red seaweed in laying hen diets over an entire production cycle to confirm the safe, long-term use of red seaweed as a dietary ingredient. Determine if the established benefits of red seaweed supplementation on hen intestinal health and protection from pathogen colonization is sustained over the production cycle.

The role of omega-3 fatty acids in bone development in pullets: investigating epigenomic response to breeder and perinatal nutrition

Dr. Elijah Kiarie, University of Guelph

Objective

Investigate the epigenetic, long-term effects of feeding breeder (parent stock) diets enriched with omega-3 fatty acids on embryonic bone development. Assess the subsequent effect on skeletal development and performance in pullets and laying hens, and on pullet behaviour when subjected to stressors.

Eggshell membrane nano-particles for biomedical applications

Dr. Maxwell Hincke, University of Ottawa

Objective

Produce and characterize eggshell membrane nano-particles. Evaluate their applications as therapeutic agents against cancer, microbial infection and inflammatory disease conditions, with an enhanced emphasis on skin applications such as cosmetics and skin cancer.

Cuticle proteins in diverse lines of hens

Dr. Bruce Rathgeber, Dalhousie University

Objective

Determine the presence of antimicrobial proteins in the eggshell cuticle from a wide range of genetic backgrounds from both commercial and heritage breeds. The study will also identify if the increased protection from *Salmonella* penetration in some hens is related to increased presence of antibacterial proteins. The study will also assess if there is a relationship with the cuticle proteins and the shell matrix proteins that would allow for selection of overall complement of shell proteins based on the cuticle protein profile.

How much omega-3 fatty acids do hens require for optimal health and productivity?

Dr. James House, University of Manitoba

Objective

Define omega-3 requirements for optimal health and performance in pullets and laying hens. Identify whether the type and levels of the omega-3 fatty acids in the diet affect birds' health and productivity. Determine the optimal quantity and type of omega-3 fatty acids to enhance immunity in pullets and laying hens to overcome an immune challenge induced by lipopolysaccharide, an inflammation-causing component of the cell wall of gram-negative bacteria.

A novel non-antibiotic strategy for controlling avian pathogenic *Escherichia coli* in laying hens

Dr. Dongyan Niu, University of Calgary

Objective

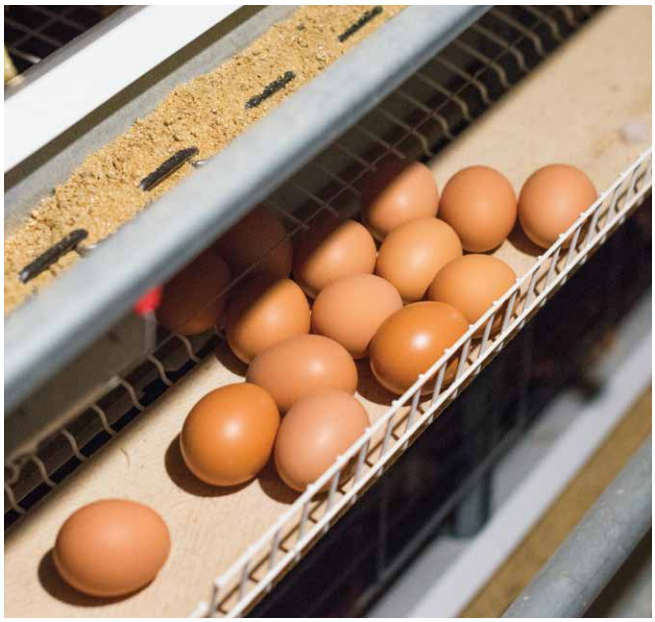
Evaluate the impact of plant tannins and bacteriophages to optimize the control of *Escherichia coli* in free run housing systems in lieu of using antibiotics.

Importance of eggshell cuticle quality for reducing bacterial adherence in table eggs

Dr. Maxwell Hincke, University of Ottawa

Objective

Identify the effect of hen age, strain and egg washing on eggshell quality and components of the eggshell cuticle. The study also looks to block bacterial adhesion and reduce pathogen contamination of table eggs in order to identify new targets for flock selection to improve cuticle quality.



Assessment of the impact of Canadian infectious bronchitis virus variants on egg production and fertility in laying hens

Dr. Faizal Careem, University of Calgary

Objective

Determine the economic impact of variant Infectious Bronchitis Virus (IBV) strains on the reproductive health (egg production and quality) of laying hens. This project also aims to propose mitigation strategies against IBV and to evaluate vaccines capable of protecting laying hens.

Determination of the metabolic triggers responsible for sexual maturation in laying hens and their relation to rearing environment and nutrition

Dr. Gregoy Bedecarrats, University of Guelph

Objective

This study aims to determine the body weight and body composition thresholds responsible for initiating sexual maturation in two strains of laying hen reared in different environments. Researchers also aim to characterize the metabolic signals responsible for activating and inhibiting the reproductive axis and determine if this is impacted by different rearing environments and if this impacts skeletal integrity.

Egg yolk lecithin supplementation to improve pulmonary health: implications for healthy individuals and individuals with Chronic Obstructive Pulmonary Disease

Dr. Mathieu Morissette, Institut universitaire de cardiologie et de pneumologie de Québec – Université Laval

Objective

Investigate the impact of egg yolk lecithin supplementation on pulmonary health and circulating phosphatidylcholine levels and lung function in healthy individuals and individuals with chronic obstructive pulmonary disease (COPD).

Develop new application of egg protein ovotransferrin as a functional food ingredient for bone health

Dr. Jianping Wu, University of Alberta

Objective

Develop a new application for ovotransferrin, a natural bioactive protein-derived egg white protein, as a functional food ingredient for use in bone health products, in order to provide a long-term approach for the prevention and mitigation of osteoporosis and an alternative to standard treatments.

Modified eggshell membrane formulations as a novel supplement to maintain gut health

Dr. Maxwell Hincke, University of Ottawa

Objective

Determine the appropriate eggshell membrane format, particle size and method of preparation to formulate a capsule-based oral supplement, which can be marketed for positive impact on human gut health.

Optimization of vaccination strategies for table egg layers controlling egg production problems induced by currently circulating infectious bronchitis virus variants

Dr. Faizal Careem, University of Calgary

Objective

Optimize vaccination strategies against false layer syndrome, shell-less egg syndrome and other egg production abnormalities induced by select IBV variants isolated from laying hens raised in Eastern and Western Canada using currently available IBV vaccines in Canada.

The fermentation of end of lay hen hydrolysate to produce pathogen-free microbiological-rich plant nutrient solutions

Mr. Marc Legault, Alberta Agriculture and Forestry

Objective

Demonstrate the value-added potential for end of lay hens by fermenting end of lay hen hydrolysate to produce an organic plant nutrient solution. Crops will be grown using this solution through commercial greenhouse techniques where crop productivity and soil health will be investigated.

The beneficial effect of egg-derived phosphatidylcholine on the obesity-related immune dysfunction

Dr. Caroline Richard, University of Alberta

Objective

Understand the direct and indirect mechanisms by which egg phosphatidylcholine can counteract the negative effect of a high-fat diet and obesity on the function of T cells (cells that play a role in immune response).

Get cracking for diabetes: an egg-based breakfast for improving blood glucose control in type 2 diabetes

Dr. Jonathan Little, University of British Columbia, Okanagan

Objective

Determine if consuming an egg-based breakfast can improve glucose control and cardiometabolic health in people with type 2 diabetes when compared to a standard low-fat breakfast.

Animal implant studies with nanotextured eggshell-based constructs for bone regeneration

Dr. Maxwell Hincke, University of Ottawa

Objective

Evaluating biocompatibility, mineralization, and integration of nano-textured eggshell-based constructs for bone replacement when implanted into rats. This study is a continuation of Dr. Hincke's "Nanotextured eggshell scaffolds for bone regeneration" project.

Use of 3D kinematics and genomics to evaluate perching biomechanics in commercial and heritage strains of enriched-housed pullets and laying hens

Dr. Clover Bench, University of Alberta

Objective

Assess the biomechanics of perching behaviour in pullets and laying hens using 3D kinematics to determine optimal phenotypes associated with specific genomic markers, stronger bones and better keel and foot health for hens housed in enriched colonies.

Mining the hen gastrointestinal microbiome for novel anti-infective probiotics to reduce the incidence of bacterial infections

Dr. Jennifer Ronholm, McGill University

Objective

To discover anti-infective novel probiotics that reduce the incidence of pathogenic gram-negative bacteria in the intestine of laying hens, with the aim to eliminate or reduce the need and use of antibiotics.

Impact of alternative housing systems on layer health and egg production

Dr. Martine Boulianne, University of Montreal

Objective

Data will be collected from commercial farms to understand the effect of enriched colonies and aviaries on laying hens' health, welfare, air and litter quality and production parameters such as egg production, feed consumption and mortalities.

Egg as a strategy to maintain retina health in people with diabetes

Dr. Miyoung Suh, University of Manitoba

Objective

Investigate the effect of lutein and omega-3 DHA-enriched egg consumption on retina health in individuals with diabetes. The results of this study will contribute to the development of prevention strategies for eye health in diabetic individuals.

Functional feedstuffs to bolster performance and immunocompetence of pullets reared at different rearing densities in enriched colony systems

Dr. Elijah Kiarie, University of Guelph

Objective

Understand the impact of functional feedstuffs (omega 3 fatty acids, yeast metabolites) on pullet growth, mortality, health and *E. coli* in enriched colony housing systems at low and high stocking densities. Additionally, this project will examine the long-term effects of functional feedstuff on laying hen performance and livability.

Egg white-alginate based biomaterial for 3D tissue engineering

Dr. Simon Tran, McGill University

Objective

Fully characterize (biochemical, physicochemical, biological) egg white alginate for use as a novel 3D scaffold to grow organoids such as salivary glands. This project is a continuation of Dr. Tran's "A novel egg white-based biomaterial for 3D tissue engineering" project.

Development of novel and alternative approaches using small-RNA based immune-stimulant molecules for control of avian infectious bronchitis virus

Dr. Neda Barjesteh, University of Montreal

Objective

Identify and evaluate the ability of small-RNA molecules to target and control infectious bronchitis virus in laying hens. The researchers will examine if these small-RNAs can increase the efficacy of IBV vaccinations.

Impact on metabolic health of new ingredients enriched with active components derived from egg yolk

Dr. Alain Doyen, Université Laval

Objective

Applying high hydrostatic pressure to egg yolk generates granule and plasma fractions enriched with active components (e.g. proteins, folic acid). This project aims to determine the digestibility and bioavailability of these fractions along with their impact on metabolic health, the microbiota, and intestinal health in humans.

Understanding the social representations of meat, eggs and animal proteins replacement products and their impact on food habits

Dr. Laurence Godin, Université Laval

Objective

Understand the role and social representations of alternatives to meat, eggs and other animal proteins, and the tensions surrounding them in Canada. This project will provide the egg industry with knowledge on emerging dietary trends and their impact on egg consumption practices.

Whole eggs for reducing inflammation and promoting muscle repair in adults with obesity

Dr. Michael De Lisio, University of Ottawa

Objective

Understand if short term increased whole egg consumption aids in muscle regeneration and reducing inflammation following exercise in obese adults.

Surveillance of egg yolk peritonitis and causative *Escherichia coli* in Alberta egg farms

Dr. Dongyan Niu, University of Calgary

Objective

Determine the prevalence and impact of egg yolk peritonitis (EYP) in Alberta pullets and laying hens. Additionally, the researchers aim to genetically characterize EYP and determine risk factors associated with its existence.

Upcoming research projects

Accelerating speed to market of an egg-derived natural health product: clinical efficacy and safety assessment of egg peptides in the management of high blood pressure

Dr. Jianping Wu, University of Alberta

Objective

Conduct a clinical trial to assess the safety and efficacy of an egg-derived peptide in the management of blood pressure through a randomized, placebo controlled trial. Assess the impact of the egg peptide product in subjects' 24 hour systolic, diastolic and mean ambulatory blood pressure for six weeks.

Precision pullet rearing strategies for optimal reproductive body condition

Dr. Martin Zuidhof, University of Alberta

Objective

Optimize nutritional management for free run pullets and hens. Understand the metabolic and physiological interactions that govern sexual maturation and lifetime egg production using precision feeding.

Optimization of environmental and hen welfare outcomes in Canadian egg production using predictive analytics (machine learning) techniques

Dr. Nathan Pelletier, University of British Columbia, Okanogan

Objective

Optimize the sustainability of the egg industry by identifying animal welfare and environmental best practices through machine-learning techniques. The results from this project will provide improvement opportunities and trade-offs to inform the on-going hen housing system transition in Canada.

Determination of ideal perch space allowance for pullets

Dr. Karen Schwean-Lardner, University of Saskatchewan

Objective

Determine minimum perch space requirements for pullets throughout rearing. Additionally, this project aims to determine the impact of perch space and genotype on growth and performance parameters, behaviour, bone strength, and keel bone damage.

The role of eggs in improving choline and DHA nutrition during development

Dr. Angela Devlin, University of British Columbia

Objective

Understand the role of eggs in child development, including if a mother's egg consumption during lactation affects nutrient composition of human milk and the impact egg consumption has on dietary nutrient intake in children. This study will also explore the cardiometabolic risk of egg consumption in women and children.

Sustainable composites from waste eggshells for practical applications

Dr. Duncan Cree, University of Saskatchewan

Objective

Determine if eggshells can improve physical, chemical and mechanical properties of polylactic acid polymers. This project aims to find alternative uses of eggshells and to widen the scope of field applications for polylactic acid polymers.

Assessing hatchery related well-being

Dr. Karen Schwean-Lardner, University of Saskatchewan

Objective

Provide evidence-based information to assist hatcheries with decision making surrounding equipment and transportation practices that promote chick welfare.

Effect of LED flicker on the welfare, health, and production of pullets reared to 16 weeks and further impacts on hen performance and egg production and quality

Dr. Karen Schwean-Lardner, University of Saskatchewan

Objective

This longitudinal study aims to determine the impact of flickering LED lights on pullet, and subsequently, the laying hen's health, welfare, and performance including egg production and egg quality.

Visit **eggfarmers.ca** or contact us at **research@eggs.ca** for more information about Egg Farmers of Canada or our research program.

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