



Thirugnanasambandham Karchiyappan

Technology Centre: Food for Health Ireland (FHI), Meat Technology Ireland (MTI), DCU

Academic Mentor: Prof. Christine Loscher, Dr. Jenny Lawler

Commercial Partner: ABP Food Group

Commercial Mentor: Declan McDonnell

Thiru started his bachelor's degree in Bharathiyar University, India. In 2009 he started his master's degree in Bharathiyar University focusing on chemistry. In 2012 Thiru started his doctoral degree in Anna University, India doing research on Recovery Of Water From Effluents Using Integrated Process Techniques. Thiru also received a Post Graduate Diploma in Computer Application and Diploma in Agriculture and has published more than 15 peer reviewed international journals as a first author.

Prof. Christine Loscher

Prof. Christine Loscher is the leader of the Immunomodulation Research Group and the Associate Dean for Research at Dublin City University (DCU); she is a Principle Investigator under Food for Health Ireland and she has developed significant expertise in commercial research and industry engagement and has secured over €5M in external funding. Under the FHI Programme she has advanced the field of development of functional foods with a particular reference to infant nutrition and healthy aging and the impact of immune modulating compounds on gut health.

Dr. Jenny Lawler

Dr. Jenny Lawler is the leader of the Membrane and Environmental Technologies Group at DCU; her research is focused on the development of polymeric membrane based solutions for protein separation for biopharma, water and wastewater treatment, along with investigation of the impact of surface nano-architecture. Her research has been funded by industry and agency including the Environmental Protection Agency, Enterprise Ireland, Science Foundation Ireland, and the Irish Research Council. She has previously collaborated with ABP Food Group on the Enterprise Ireland funded Innovation Partnership "EXEMPLAR", implementing novel membrane-based technologies for treatment of abattoir wastewater.

Food for Health Ireland (FHI)

Food for Health Ireland (FHI) unites world-class science and industry expertise to improve health through innovation in food. Its purpose is to identify novel ingredients coming from milk to develop functional food ingredients that will offer health benefits to consumers. FHI links world-class academic research with industry vision for the potential of successful market innovations. The industry-focused research strategy within FHI includes the identification, development and exploitation of novel milk-derived bioactive compounds for improving health and wellbeing.

Meat Technology Ireland (MTI)

Meat Technology Ireland (MTI) is an industry-led initiative that will build a strategic research and innovation base in beef and sheep meat processing in Ireland. The Centre is a 'one-stop shop' for meat processing research and technology, serving as a hub to co-ordinate all beef and sheep meat processing research needs. MTI is hosted by Teagasc at its Ashtown Food Research Facility in Dublin with Technological University Dublin, Dublin City University, University College Cork and the Irish Cattle Breeders Federation involved as research providers.

Declan McDonnell

Declan McDonnell is Research and Development Manager at ABP. He mentored Marie Sklodowska-Curie Career Fit fellow in collaboration with Teagasc. Declan has been involved in the EXEMPLAR project, where a number of postdoctoral researchers have been based at ABP Cahir site. He leads and manages a team of 6 expert researchers and has enabled them to develop & contribute to projects worth €20m/yr to ABP.

ABP Food Group

ABP Food Group have built their success on entrepreneurship, technological investment and a deep knowledge of the sectors in which they operate. As key stakeholders in the food supply chain they're dedicated to ensuring product innovation, product quality, and the full traceability of their products. Their core business – ABP Beef – is supported by its renewable, pet food and protein divisions, which combine to ensure the value of by-products is maximized and the environmental impact of their business and customers is minimized. They continually develop, research, innovate and invest in every area of their business. In recent years, ABP invested more than €50M into upgrading of their flagship facility at Cahir, including €16.5M on the construction of a new gel bone facility as part of the rendering plant. This is the only gel bone facility in the UK and Ireland, and it opened up markets in the pharma sector to ABP; of significant interest here also is the separation of blood products into fractions (plasma, haem and globin) and they have invested significant effort into research to optimise operations, such as comparison between centrifugation versus membrane filtration.

Thiru's project

“Functional Food Potential of Meat Processing Waste Streams: a Peptidomics, Membrane Filtration and Immunology Approach”

By-products from meat processing (such as blood and skin) are currently used in low value products or animal feed, and vast quantities of waste require treatment prior to disposal, to avoid detrimental environmental impact. However, these waste streams have the potential to be a valuable source of nutrition, as they contain large quantities of protein.

From a sustainability point of view, it is becoming increasingly important to target non-traditional sources of dietary value. Production of functional foods and food supplements is an increasingly important segment of the food and agri-food business, for example the proliferation in whey protein products on the market. Proteins are a key dietary nutrient, and bioactive peptides are essentially proteins which have been broken down, many of which have been identified as having significant health benefits.

In this project, it is planned to do a full screening of the hydrolysed proteins/peptides that are available in abattoir waste streams, using a technique called peptidomics, which uses state of the art equipment to generate a list of potential peptides that could have a positive impact on human health. Immunomodulation is a change in the body's immune system, caused by agents that activate or suppress its function.

Thiru proposes to test which of these peptides have the potential to have a positive impact on the human immune system, using cutting edge immunological screening techniques, which have been validated through the FHI programme. Once he has identified a range of peptides that potentially have positive health benefits, Thiru will develop a cost-effective method for recovery of target proteins and purification using membrane filtration techniques. This project will be an important first step in development of a new functional food or food supplement which will add significant value to the beef processing market, a key Irish product nationally and internationally.