SCIENCE AND INDUSTRY ENDOWMENT FUND

CASE STUDY OF IMPACT
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Delivering better health outcomes for Australians in the future

EpiSCOPE project identifies early-life risk predictors for adult lifestyle diseases

The challenge

Adult lifestyle diseases are a growing problem for the Australian health system and economy. This is especially the case with obesity and obesity-related diseases, which cost the Australian economy $56.6 billion a year[1]. Obesity is a major risk factor for several diseases, such as diabetes, hypertension, and coronary heart disease. In 2011, around 26% of Australian children aged 7 – 15 years old were considered to be overweight or obese, double the prevalence recorded in 1986. Childhood obesity has considerable implications for adult obesity rates that are continuing to increase.

Understanding the influence of epigenetics on obesity assists in the early diagnosis of people's susceptibility to becoming obese; and enables more effective management of this lifestyle issue.

EpiSCOPE aims to develop a predictive test for obesity and other health issues for children.

The response

The SIEF-funded EpiSCOPE project is a collaborative project of CSIRO, the Garvan Institute of Medical Research, the Women's and Children's Health Research Institute, and the University of South Australia. It explores the role of epigenetics in the development of human obesity and metabolic diseases. Epigenomes (a phenomena often referred to as the "ghost in our genes") 'authorises' the way in which information in a genome - the letters in the DNA code - is used throughout life (i.e. the epigenome brings the genome to life). This ultimately influences the expression of certain traits, including our risk of obesity and its associated metabolic diseases later in life.

By identifying the epigenetic signatures established early in life that are associated with the risk of obesity later in life, there is potential for modification of this set of semi-permanent, epigenetic molecular signatures.

Understanding the epigenome is not confined to humans, but is also a key goal in the livestock industry. The understanding of epigenetic mechanisms will enable improvement of livestock production traits, such as metabolic efficiency and growth rate, leading to a more efficient and sustainable industry.

The EpiSCOPE project aims to enable the identification of early genetic risk predictors for obesity which will help guide nutritional advice for mothers during pregnancy and dietary recommendations for reversing the genetic programming of obese people.

The project is working towards developing a predictive test for obesity and other health issues for children to enable the early detection of, and intervention for, at-risk children.

The impact

Understanding the influence of epigenetics on obesity, being able to test for obesity predisposition, and being able to amend the genetic programming of obese people, all have the potential to provide significant health and economic benefits for Australia in the future. The project also has potentially important benefits for the Australian livestock industry.

Based on conservative valuations, the net present value of the EpiSCOPE project is $422 million. The project has a benefit-cost ratio of 69[2].

[1] A Colagiuri S, Lee CMY, Colagiuri R et al. 2010. The cost of overweight and obesity in Australia. *The Medical Journal of Australia* 192, 260–64.

[2] ACIL Allen Consulting. 2016. SIEF Impact Case Studies. Canberra: ACIL Allen.

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This case study was developed by ACIL Allen and CSIRO in 2016 as part of an overarching review of SIEF's Impact.