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Non-targeted effects of childhood vaccines: Epidemiological evidence and emerging immunological mechanisms

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It is now recognised that vaccines administered in infancy can have non-targeted or heterologous effects on the immune system and alter susceptibility to non-vaccine related infections. In the case of BCG and measles vaccines these effects are beneficial leading to decreased susceptibility to infections; while for other vaccines such as the diphtheria, tetanus, pertussis vaccine (DTP) these can be harmful leading to increased infections and all-cause mortality. Intriguingly, female infants are generally more susceptible to non-targeted effects of vaccines than males. The immunological basis for such non-targeted effects are beginning to be teased out, and are likely multifactorial. For BCG vaccination, it has been shown that the vaccine can have epigenetic effects leading to enhanced innate immunity; while DTP vaccine can suppress innate and T cell immunity. The reasons for sex differences include the effects of sex hormones, X- and Y-linked immune response genes and microRNAs. This talk will discuss the epidemiological and immunological evidence for non-targeted effects of vaccines, and describe newly emerging data that support sex-differential heterologous effects of DTP and measles vaccination in infants.

Biography

Associate Professor Katie Flanagan is a clinical Associate Professor at the University of Tasmania and leads the Infectious Diseases Service at Launceston General Hospital. She is also an Adjunct Senior Lecturer in the Department of Immunology at Monash University in Melbourne. She obtained a degree in Physiological Sciences from Oxford University in 1988, and her MBBS from the University of London in 1992. She is a UK and Australia accredited Infectious Diseases Physician. She did a PhD in malaria immunology based at Oxford University (1997 - 2000). She was previously Head of Infant Immunology Research at the MRC Laboratories in The Gambia from 2005-11 where she conducted multiple immunological vaccine trials in neonates and infants. Her research aims to understand how the infant immune system develops in response to vaccines and infections encountered in early life, and the impact of ageing on immune responses to vaccines, with a particular focus on sex differences in immunity and non-targeted effects of vaccines.

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