

Emory University Department of Anthropology

CALEN P. RYAN

TRADEOFFS BETWEEN REPRODUCTION AND AGING IN THE HUMAN EPIGENOME



Calen Ryan (Northwestern U) is a human biologist and anthropological geneticist whose work utilizes bioinformatics and computational statistics to analyze high-throughput epigenetic data from large population datasets. His work in the Philippines explores the impact of reproduction on women's health and aging and the effect of early life socioeconomic exposures on development and health. He is also interested in the role of hypermutable – or 'junk' – DNA in evolution and disease, and the intergenerational epigenetic legacy of the paternal preconception environment. The overarching aim of his research is to shed light on how our evolutionary past and lived experiences in the present come together to shape our biology and health.

Why do we age, and why do some individuals appear to 'age' more rapidly than others? Evolutionary theory leads to the prediction that energy allocated to one function, such as reproduction, should come at the expense of bodily maintenance, accelerating biological aging. Such 'costs of reproduction' are supported by experimental work in non-human animals and epidemiological data in human populations – especially among women, for whom the energetic contribution to pregnancy and lactation is high. Nevertheless, many questions about the costs of reproduction among humans remain unanswered. When are costs of reproduction incurred? How early in women's lives might we detect such costs? And what biological pathways connect reproductive processes to women's aging and health? In this talk, Ryan will discuss a major theme of his research, which is aimed at addressing these questions by studying the epigenome, a set of molecular processes associated with gene activity and cellular memory. He will also discuss some of the ways that he and his collaborators are working to understand the broader impact of the social and physical environment on development and the epigenome across the life course. The overarching aim of this research is to shed light on how our evolutionary past and lived experiences in the present come together to shape our biology and health.

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