

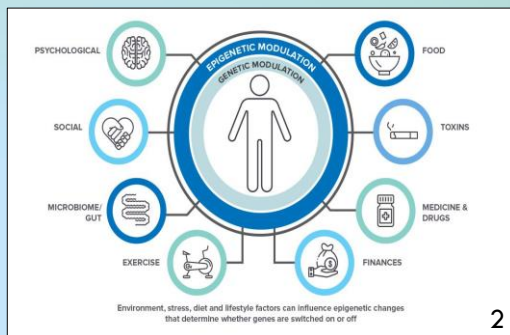


Molecular Epidemiology and its Relevance to the SPACE Project

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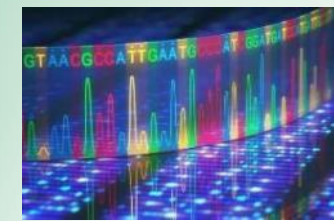
WHAT IS MOLECULAR EPIDEMIOLOGY?

Molecular epidemiology is the study of how genetics and the environment impact our health. One biological marker we used is called **epigenetics**, i.e. the study of gene expression changes which occur due to reversible genetic changes, which don't disrupt the genetic code. For example, identical twins have the same genetic makeup; however, over the course of their lives their epigenetics can differentiate according to where they live, their lifestyle etc. Location can have an impact due to exposures such as air quality, soil composition and water sources. We tease out the impact of certain exposures to build evidence **to support positive lifestyle changes**, e.g. spend more time outdoors, or increase our activity.



CONTRIBUTIONS TO THE SPACE PROJECT

As a member of technical staff on the SPACE project my role has been to generate a wealth of sequencing data, which is then analysed by researchers. I have carried out Next Generation Sequencing (NGS) using the Ion S5 Sequencer. We have used the S5 to generate **transcriptomic** profiles for individuals. We utilise this data alongside previously generated epigenetic data to determine what environmental exposures change our epigenetics to **alter gene expression**, suggesting these changes may have **real functional consequences**. This analysis gives a detailed look into a person's epigenetics and can give an indication of the impacts of certain environmental stressors on human health.



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Illustrations References:

1 <https://www.npr.org/2012/01/02/144583977/twins-data-reshaping-nature-versus-nurture-debate>

2 <https://thehumanbeautymovement.com/epigenetics-explained/>

3 <https://www.thermofisher.com/order/catalog/product/A38194>

4 <https://singularityhub.com/2019/02/01/how-genome-sequencing-and-senolytics-can-help-us-live-healthier-longer/>