What is genetic association studies (GWAS)?

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WHAT IS... Genetic Association Studies (GWAS)

DNA STRUCTURE

- DNA contains the genetic instructions for the development and function of living things.
- It is a polymer that contains two strands coiled together to form a double helix.
- The strands are made of nucleotides, each of which consists of sugar and phosphate group linked to one of four bases: thymine (T), adenine (A), guanine (G) and cytosine (C).

Gene & Genome

- A gene is a basic unit of heredity.
- Entire genetic material of an organism is called genome. It helps to search for genes linked to different types of physical traits.
- Researchers are always seek for highly associated GENES for a particular physical traits or disease.

Many Physical Traits (say, skin color, facial features) are not determined by single Genes, but a combination of many GENES

GWAS Statistical Model

- Genes are analysed, compared statistically, and plot Manhattan Plot which gained its name from 'Manhattan Skyline'.
- BUT HOW DO RESEARCHERS KNOW WHICH GENE CONTRIBUTE TO A TRAITE MOST???
- GWAS information may be used to predict someone's risk of developing a certain condition based on his or her GENE structure.
- Highly associated Genes can be shown in Manhattan plot.
- The points which lies above the blue diagonal line and the horizontal red lines indicates newly detected GENES.

Response Variable: Skin Color

IN GENOME-WIDE ASSOCIATION STUDIES OR GWAS, RESEARCHERS INTERROGATE SNPs THAT COMMONLY ARISE IN THE POPULATION... AND ASK WHETHER THEY ASSOCIATE WITH DISEASE.

GWAS information may be used to predict someone's risk of developing a certain condition based on his or her GENE structure.