



Education Blast: Summer Course in Clinical Research



WHAT IS EPIGENETICS?

The development and maintenance of an organism is orchestrated by a set of chemical reactions that switch parts of the genome off and on at strategic times and locations. Epigenetics is the study of these reactions and the factors that influence them.



EPIGENETICS & THE ENVIRONMENT

The genome dynamically responds to the environment. Stress, diet, behavior, toxins and other factors activate chemical switches that regulate gene expression.

GENETIC ASSOCIATION STUDY DESIGNS

- COHORT DESIGNS IN GENETICS ARE RARE
 - LOW POWER AND LONG LATENCY TILL PHENOTYPE
 - EXPENSIVE
- FAMILY BASED ASSOCIATION
 - ODDS OF TRANSMISSION OF AN ALLELE
 - BEST WITH INTACT FAMILIES (LESS MISSING DATA)
 - MAY BE BIASED WITH RESPECT TO EXPOSURE
- CASE CONTROL IS THE PREFERRED DESIGN
 - COSTLY TO MEASURE EXPOSURE BIOMARKERS
 - ESSENTIALLY CROSS SECTIONAL DESIGN
 - SUBJECT TO RECALL BIAS

ENVIRONMENTAL EPIDEMIOLOGY

- HAS BEEN LESS "DISEASE" FOCUSED THAN GENETICS, AT LEAST IN PEDIATRICS
 - I.E. CASE CONTROL STUDIES HAVE "ISSUES"
- WHY?
 - UNLIKE DNA SEQUENCE, EXPOSURE IS NOT STATIC
 - RECONSTRUCTING ENVIRONMENTAL EXPOSURE IN A CASE CONTROL DESIGN DIFFICULT IF NOT IMPOSSIBLE.
 - PROSPECTIVE STUDIES ARE IDEAL
 - LIMITATION - LAG BETWEEN EXPOSURE AND PHENOTYPE CAN BE MANY YEARS
 - BENZENE AND CANCER
 - CHILDHOOD LEAD POISONING AND ALZHEIMERS??