EPID 6320 – Molecular Epidemiology

Course Learning Objectives

1. Identify the criteria used to evaluate a potential biomarker in molecular epidemiologic research
2. Describe the major problems in collecting, storing and processing various biological samples for molecular epidemiologic studies, including principles of quality control for laboratory assays
3. Evaluate the major study designs used in molecular epidemiology
4. Identify basic technologies in the field of human genetics
5. Describe the basic principles behind major molecular biology techniques, such as PCR, and their applications in molecular epidemiologic studies
6. Discuss the Hardy-Weinberg principle and estimate allele and genotype frequencies
7. Calculate simple statistics, such as odds ratio and chi-square
8. Distinguish between linkage and association studies
9. Describe the difference between family-based and population-based studies
10. Interpret results of a linkage study
11. Interpret results of an association study
12. Identify and describe the important ethical and legal issues involved in using human fluid or tissue specimens for research in an epidemiologic context
13. Critically evaluate the use of biomarkers as indicators of the internal dose of exogenous substances such as environmental mutagens and micronutrients
14. Critically evaluate efforts to study the role of genetic variation in disease causation
15. Describe the inferences drawn from the different molecular epidemiologic studies
16. Describe major molecular mechanisms of disease causation
17. Describe methods to characterize gene-gene and gene-environment interactions