The Pacific: Laboratory for Microevolution

- Typological classification
- Hybridization
- After 1950: new paradigm
- Processes of evolution (selection etc.)
- Synthetic theory of evolution
- Population genetics
- Evolution: change in gene frequencies

Hardy-Weinberg Equilibrium Model

- no mutation
- no natural selection
- population is infinitely large
- all members of the population breed
- all mating is totally random
- same number of offspring
- no migration

Processes of Evolution

1) gene flow
2) mutations
3) selection
4) genetic drift
5) non-random mating
Sources of New Variation

- Recombination
- Crossing-Over
- Mutations

Small Population Size Effects
Genetic Drift/Founder Principle

- Bottleneck Effect
- Founder Principle

Non-Random Mating
- Positive Assortative Mating
- Negative Assortative Mating
- Consanguineous Mating
Natural Selection

On the Origin of Species, (Darwin, 1859)

Sickle cell anemia (SS, SA)
Malaria

Gene Flow

Distribution of A allele
Distribution of B allele

Summary
- Recombination
- Mutation
- Genetic drift
- Non-random mating
- Natural selection
- Gene flow
Pacific: Genetic Drift
Fixation of certain alleles; lost of certain genes
Cultural factors: kinship grouping, migrations, etc.
Natural catastrophes: tidal waves, hurricanes, and droughts

Initial Peopling of the Pacific
Western Contact
Social disorganization
Epidemics
Migration
Indentured laborers
Etc.

Inhabitants of Sonsorol Islands and Ulithi
Microevolutionary processes and small islands/populations


Discussion Questions

What are the major forces of evolution? Briefly explain each force.

How have these evolutionary mechanisms shaped human biology in the Pacific?
Reading for next class

- Oppenheimer S. 2004 The ‘Express Train from Taiwan to Polynesia: on the congruence of proxy lines of evidence. World Archaeology 36:591-600.