



Research Methods in Psychology

Lab 3. “Stereo Love” Main Article Summary

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What are we going to do?

Main article summary (Assignment 3)

Why are we doing this?

How to study articles?

Assignment 3 rubrics



A big picture

Conducting psychological research

Finding psychological research questions (assignment 1)

Finding relevant articles (assignment 2)



A big picture

What is the next step?

Read related articles

- How did past research conduct studies?
- What did past research find?
- How can you extend previous findings?

Time to enjoy studying the articles



A big picture

Do you like reading articles?

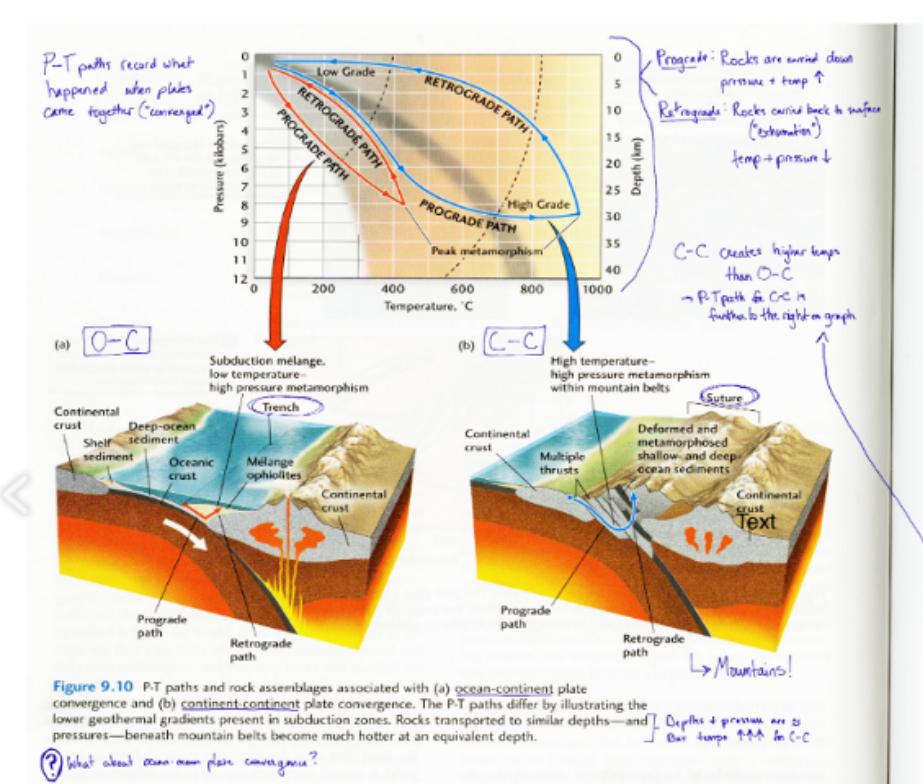


Figure 9.10 P-T paths and rock assemblages associated with (a) ocean-continent plate convergence and (b) continent-continent plate convergence. The P-T paths differ by illustrating the lower geothermal gradients present in subduction zones. Rocks transported to similar depths—and pressures—beneath mountain belts become much hotter at an equivalent depth.



A big picture

Do you like reading articles?

Ecology drives a global network of gene exchange connecting the human microbiome

Chris S. Smillie^{1*}, Mark B. Smith^{2*}, Jonathan Friedman¹, Otto X. Cordero³, Lawrence A. David⁴ & Eric J. Alm^{3,5,6}

general background → Horizontal gene transfer (HGT), the acquisition of genetic material from non-parental lineages, is known to be important in bacterial evolution^{1–3}. In particular, HGT provides rapid access to genetic innovations, allowing traits such as virulence⁴, antibiotic resistance⁴ and xenobiotic metabolism⁵ to spread through the human microbiome. Recent anecdotal studies providing snapshots of active gene flow in the human body have highlighted the need to determine the frequency of such recent transfers and the forces that govern these events^{4,5}. Here we report the discovery and characterization of a vast, human-associated network of gene exchange, large enough to directly compare the principal forces shaping HGT. We show that this network of 10,770 unique, recently transferred (more than 99% nucleotide identity) genes found in 2,235 full bacterial genomes, is shaped principally by ecology rather than geography or phylogeny, with most gene exchange occurring between isolates from ecologically similar, but geographically separated, environments. For example, we observe 25-fold more HGT between human-associated bacteria than among ecologically diverse non-human isolates ($P = 3.0 \times 10^{-279}$). We show that within the human microbiome this ecological architecture continues across multiple spatial scales, functional classes and ecological niches with transfer further enriched among bacteria that inhabit the same body site, have the same oxygen tolerance or have the same ability to cause disease. This structure offers a window into the molecular traits that define ecological niches, insight that we use to uncover sources of antibiotic resistance and identify genes associated with the pathology of meningitis and other diseases.

specific background → acquired from close relatives, because these genes have greater compatibility with native molecular machinery^{15,16}.

knowledge gap → Geography might provide an alternative structure to HGT by restricting dispersal, as suggested by the geographically organized distribution of *Vibrio cholera* integrons¹⁷ and NDM-1 antibiotic resistance genes¹⁸.

here we show... → A third possibility is that ecological similarity shapes networks of gene exchange by selecting for the transfer and proliferation of adaptive traits or by increasing physical interactions between community members. Reports of enriched levels of HGT between hyperthermophiles¹⁹ and spatially segregated exchange among *Shewanella* isolates²⁰ offer suggestive glimpses of such an ecological structure. However, it has been difficult to determine whether ecology has a broader function in HGT because of the limited availability of genomes from similar environments and because most previous work has ignored the distinction between recent transfers and ancient events. The inclusion of transfers from millions or billions of years in the past can obscure ecological structure, because historical niches may not reflect modern environmental associations.

results with key, concrete values → To explore the effects of phylogeny, geography and ecology on HGT we use an evolutionary-rate heuristic to identify recent transfers between thousands of microbial genomes. Our heuristic finds blocks of nearly identical DNA (more than 500 nucleotides, more than 99% identity) in distantly related genomes (less than 97% 16S rRNA similarity). HGT is the best explanation for these observations because the highly conserved 16S gene evolves about 25-fold more slowly than protein-coding synonymous sites²¹. As a result, vertically inherited orthologues in such divergent genomes are nearly saturated with mutations at

meaning of results → The human body is a complex biological network comprising ten

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Main article summary

How to study peer-reviewed articles?

Pieces of a typical article

- Title: topic and information about the authors
- Abstract: brief overview of the articles
- Introduction: background information and statement of research hypotheses
- Methods: Details of how the study was conducted, instruments used, variables measured



Main article summary

How to study peer-reviewed articles?

Pieces of a typical article

- Results: All the data of the study along with figures, tables, and/or graphs
- Discussion: The interpretations of the results and implications of the study
- References: Citations of sources from where the information was obtained



Main article summary

How to study peer-reviewed articles?

So, do I read from page 1 to page 999?

Take it easy! Don't overwhelm yourself to understand everything

Condense and paraphrase what you read using your own language

Be interactive; taking notes, annotating, finding resources, etc.



Main article summary

Assignment 3 rubrics

From assignment 2, select the most relevant article (only one article)

Provide APA-style reference of that paper

Summarize the paper using the **template**

Show CatCourses...



Main article summary

Assignment 3 formats

Type this assignment and include your name and student ID

PDF format only

Assignment 3 deadline

Due at 9 am on September 20

No late work will be accepted except for extreme or emergent circumstances



Before you go home...

Any questions or comments?



Thanks! Have a good one!

