

# How Quorum Sensing Interactions Affect Microbial Population Structure

02712 Final Project

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# Background

# Quorum-Sensing Systems

# Public Goods and Cheating

# Maintaining Freeloaders as a Diversity Reservoir

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- ▶  $K_{ac}$  is of dimension  $|R| \times |S| = |N| \times |N|$
- ▶ Different sets of receptor-signal combinations can produce the same  $K_{ac}$



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Matrix for 2 strains  $R_1S_1$  and  $R_2S_2$

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## Custom Matrix

Matrix for 2 strains  $R_1R_2S_1$  and  $R_2S_2$

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# Model

# Results

# Example Section

# Citation Example

- ▶ the citation file is at `./Documents/citations.bib`

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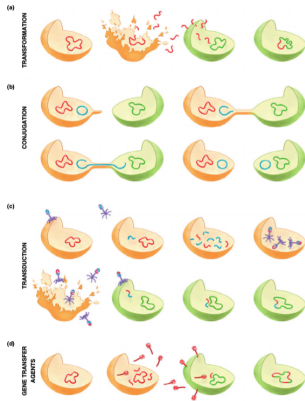
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## Example 2 column slide



- **Transformation:**  
Incorporation of free-floating DNA into the genome

Figure 1: HGT Mechanisms

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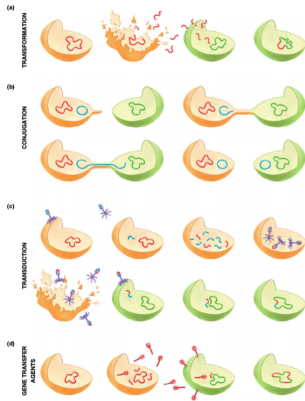


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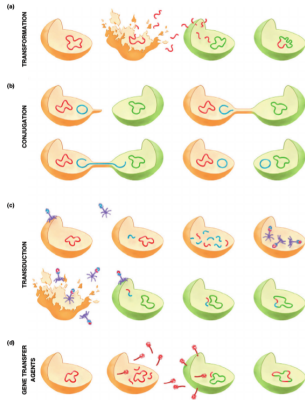


Figure 1: HGT Mechanisms

- ▶ **Transformation:** Incorporation of free-floating DNA into the genome
- ▶ **Conjugation:** Transfer of DNA through cell-cell connections
- ▶ **Transduction:** Transfer of DNA via phage



## table with math

<i>Genotype</i>	<i>Environment</i>		
	$E_n$	$E_b$	$E_a$
<i>RCH</i>	$1 - 2s_m$	$(1 + s_p)(1 - 2s_m)$	$(1 + s_p)(1 - 2s_m)$
<i>RCh</i>	$1 - s_m$	$(1 + s_p)(1 - s_m)$	$(1 + s_p)(1 - s_m)$
<i>RcH</i>	$1 - s_m$	$1 - s_m$	$(1 + s_p)(1 - s_m)$
<i>Rch</i>	1	1	$1 + s_p$
<i>rCH</i>	$1 - 2s_m$	$(1 + s_p)(1 - 2s_m)$	$1 - 2s_m$
<i>rCh</i>	$1 - s_m$	$(1 + s_p)(1 - s_m)$	$1 - s_m$
<i>rch</i>	$1 - s_m$	$1 - s_m$	$1 - s_m$
<i>rch</i>	1	1	1

Table 1: Relative fitness values for each genotype in each environment

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  - ◇ average fitness  $\bar{w} = \sum_g x_g^s f(g)$

## Example code block

```
def foo(bar):  
    for i in range(69, 420):  
        if i == 69 or i == 420:  
            print('nice')  
        else:  
            print(bar)  
    return None
```

## Bibliography I

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