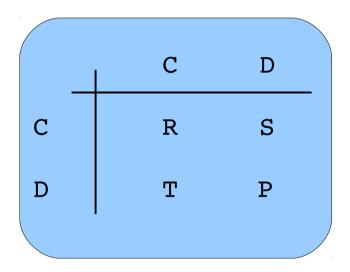
Conflict and Cooperation in Microorganisms

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Exercise1

Analyze this game with different conditions e.g., T>R>P>S, T>R>S>P, ...



R: Reward for mutual cooperation

P: Punishment for mutual defection

T: Temptation to defect

S: Sucker's payoff

Exercise2

We discussed the following four papers in class; write a comment on what you think of the paper that your group presented and/or simulate the basic evolutionary dynamics linked to it (and comment the results).

- Mol Microbiol. 2011 Jan; 79(1):166-79. A molecular mechanism that stabilizes cooperative secretions in Pseudomonas aeruginosa. Xavier JB, Kim W, Foster KR.
- PLoS Biol. 2010 Sep 14;8(9).A mixture of "cheats" and "co-operators" can enable maximal group benefit. MaClean RC, Fuentes-Hernandez A, Greig D, Hurst LD, Gudelj I.
- Proc Natl Acad Sci U S A. 2009 Sep 15;106(37):15786-90. The evolution of information suppression in communicating robots with conflicting interests. Mitri S, Floreano D, Keller L.
- Nature 467: 82-86 (2010). Bacterial charity work leads to population-wide resistance. Lee HH, Molla MN, Cantor CR and Collins JJ.

Exercise3

- Simulate the Simpson's paradox in matlab
- Discuss the conditions in which cooperation evolves, plotting several parameters spaces; e.g., number of groups vs. size of groups, etc.
- Use Price's equation to explain the results.