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Cell fate determination dynamics in bacteria ANNA KUCHINA, UT Southwestern Medical Center, LORENA ESPINAR, Universitat Politecnica de Catalunya, TOLGA CAGATAY, UT Southwestern Medical Center, JORDI GARCIA-OJALVO, Universitat Politecnica de Catalunya, GUROL SUEL, UT Southwestern Medical Center — The fitness of an organism depends on many processes that serve the purpose to adapt to changing environment in a robust and coordinated fashion. One example of such process is cellular fate determination. In the presence of a variety of alternative responses each cell adopting a particular fate represents a "choice" that must be tightly regulated to ensure the best survival strategy for the population taking into account the broad range of possible environmental challenges. We investigated this problem in the model organism B.Subtilis which under stress conditions differentiates terminally into highly resistant spores or initiates an alternative transient state of competence. The dynamics underlying cell fate choice remains largely unknown. We utilize quantitative fluorescent microscopy to track the activities of genes involved in these responses on a single-cell level. We explored the importance of temporal interactions between competing cell fates by re- engineering the differentiation programs. I will discuss how the precise dynamics of cellular "decision-making" governed by the corresponding biological circuits may enable cells to adjust to diverse environments and determine survival.

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