

Abstract Submitted  
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**Temporal competition between differentiation programs determines cell fate choice** ANNA KUCHINA, UT Southwestern Medical Center, LORENA ESPINAR, Universitat Politècnica de Catalunya, TOLGA CAGATAY, ALEJANDRO BALBIN, ALMA ALVARADO, UT Southwestern Medical Center, JORDI GARCIA-OJALVO, Universitat Politècnica de Catalunya, GUROL SUEL, UT Southwestern Medical Center — During pluripotent differentiation, cells adopt one of several distinct fates. The dynamics of this decision-making process are poorly understood, since cell fate choice may be governed by interactions between differentiation programs that are active at the same time. We studied the dynamics of decision-making in the model organism *Bacillus subtilis* by simultaneously measuring the activities of competing differentiation programs (sporulation and competence) in single cells. We discovered a precise switch-like point of cell fate choice previously hidden by cell-cell variability. Engineered artificial crosslinks between competence and sporulation circuits revealed that the precision of this choice is generated by temporal competition between the key players of two differentiation programs. Modeling suggests that variable progression towards a switch-like decision might represent a general strategy to maximize adaptability and robustness of cellular decision-making.

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