

LECTURE 6: NETWORK MOTIFS (TEMPORAL PROGRAMS)

Introduction to cellular system modelling
Daniel Georgiev

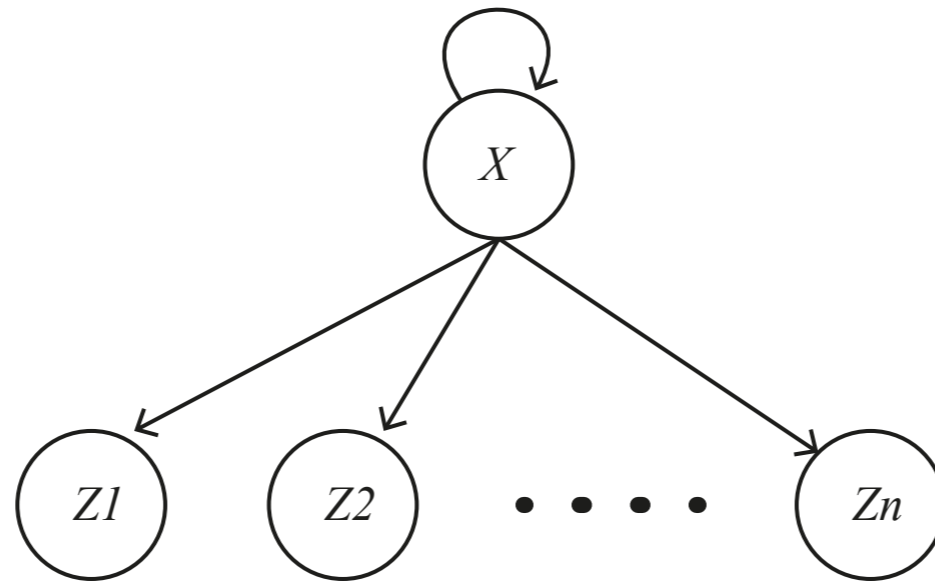
Summer 2015

OUTLINE

- SIM
- Arginine example
- MO FFL
- Flagella video and example
- Interlocked FFL
- Bacillus subtilis spore development
- Bacterial brain
- motifs in Rule Bender
- MATLAB programming

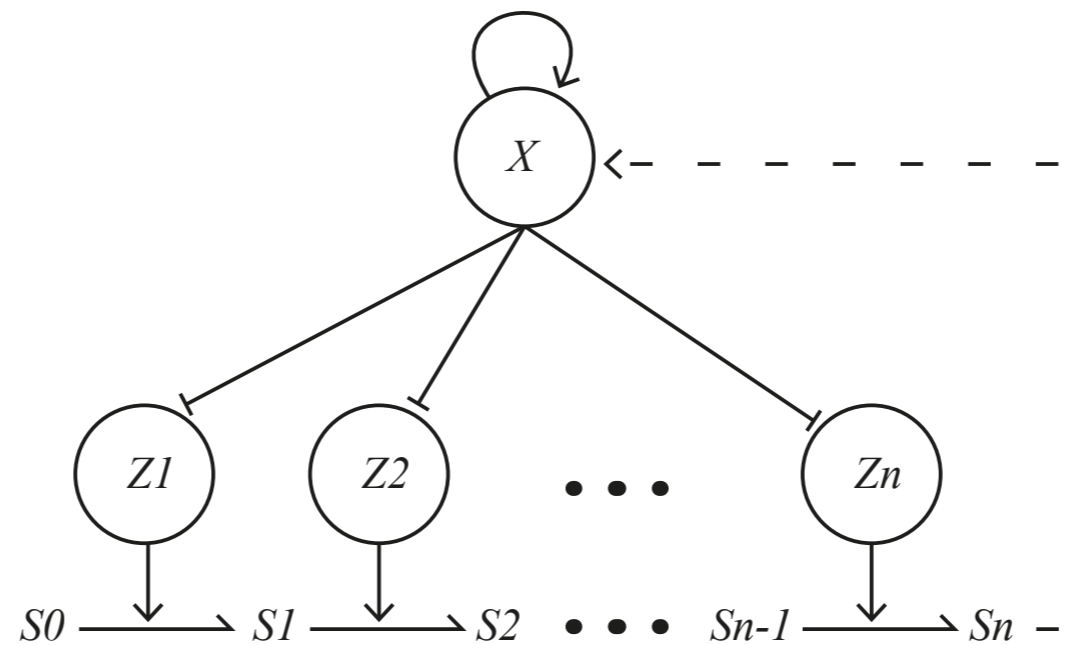
SIM

Single Input Module (SIM) represents a multi-node motif where a single regulator (a master) regulates many other genes.

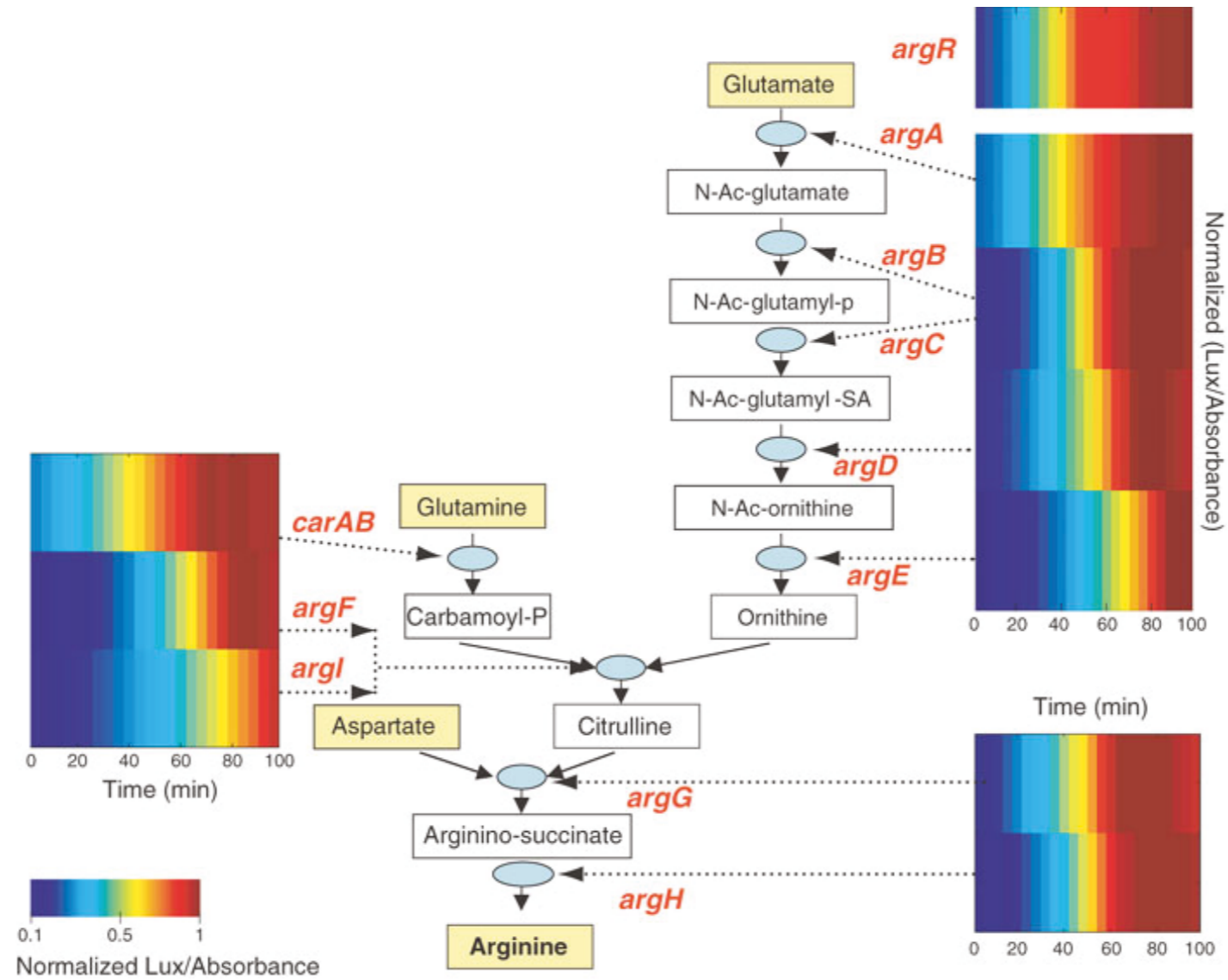


SIM - METABOLIC PATHWAYS

SIMs are commonly used to establish temporal order of metabolic pathways (LIFO).

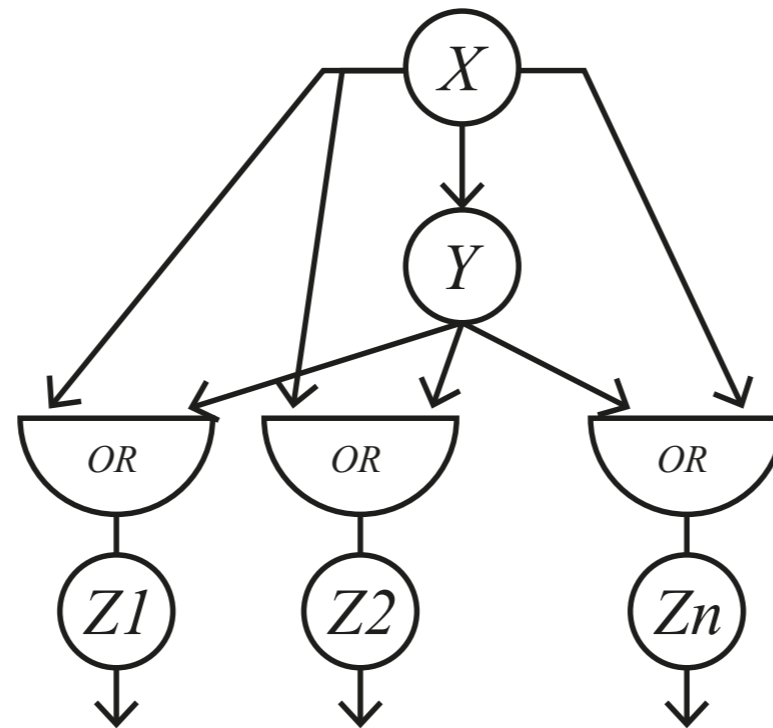


ARGENINE BIOSYNTHESIS



MO C1 FFL

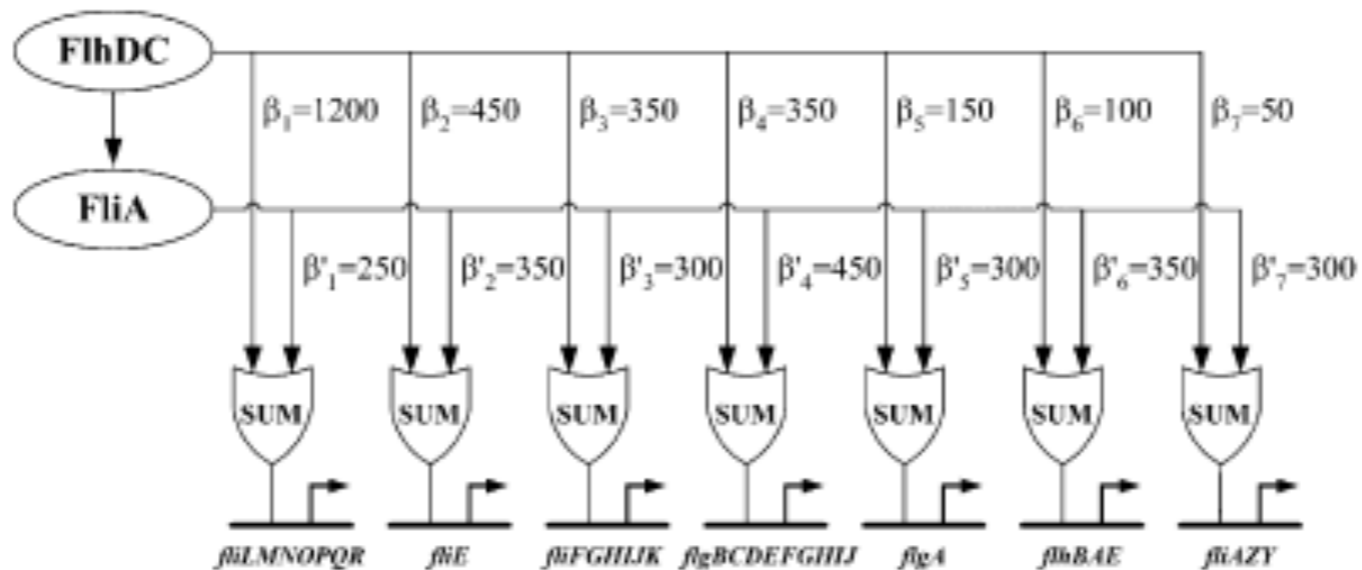
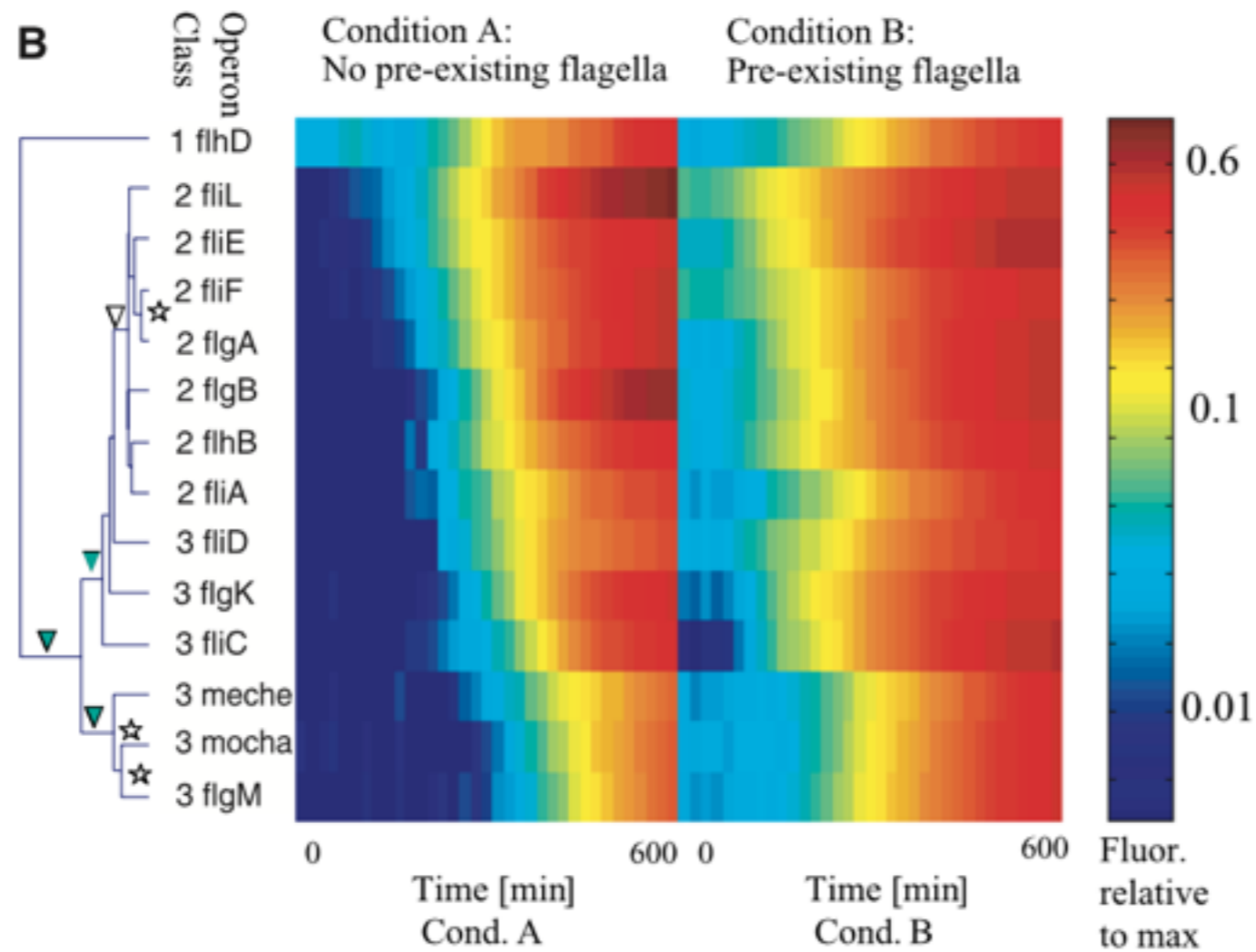
MO FFL is a topological generalization of the FFL motif and establishes a temporal order in different pathways (FIFO).





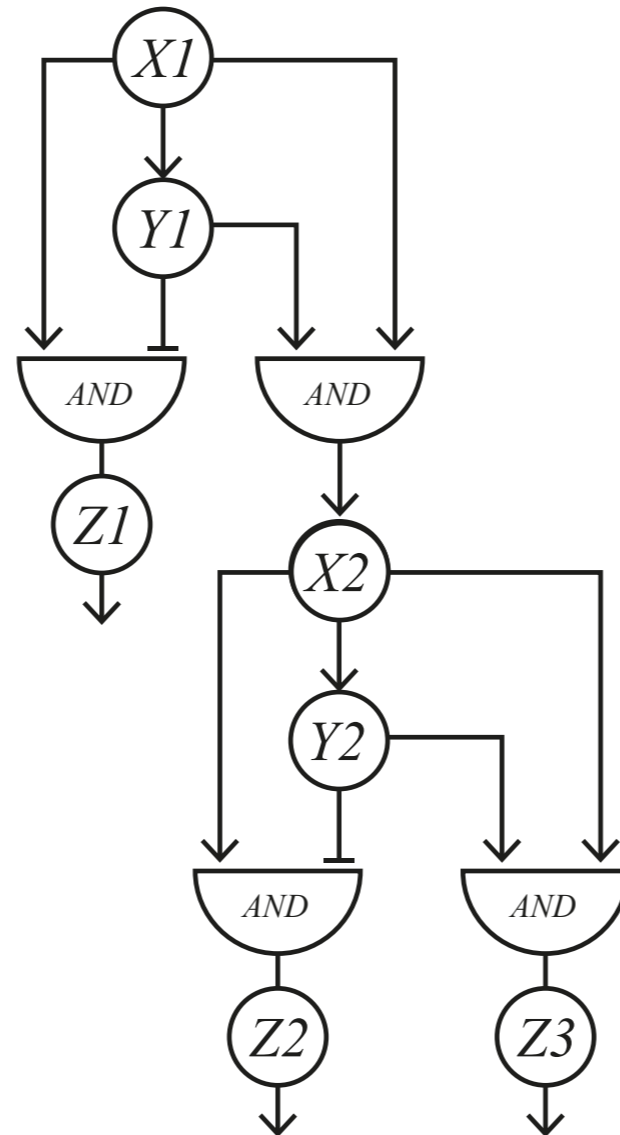
Protonic
NanoMachine
Project
ERA-TO, JST

MO C1 FFL IN FLAGELLA PATHWAY

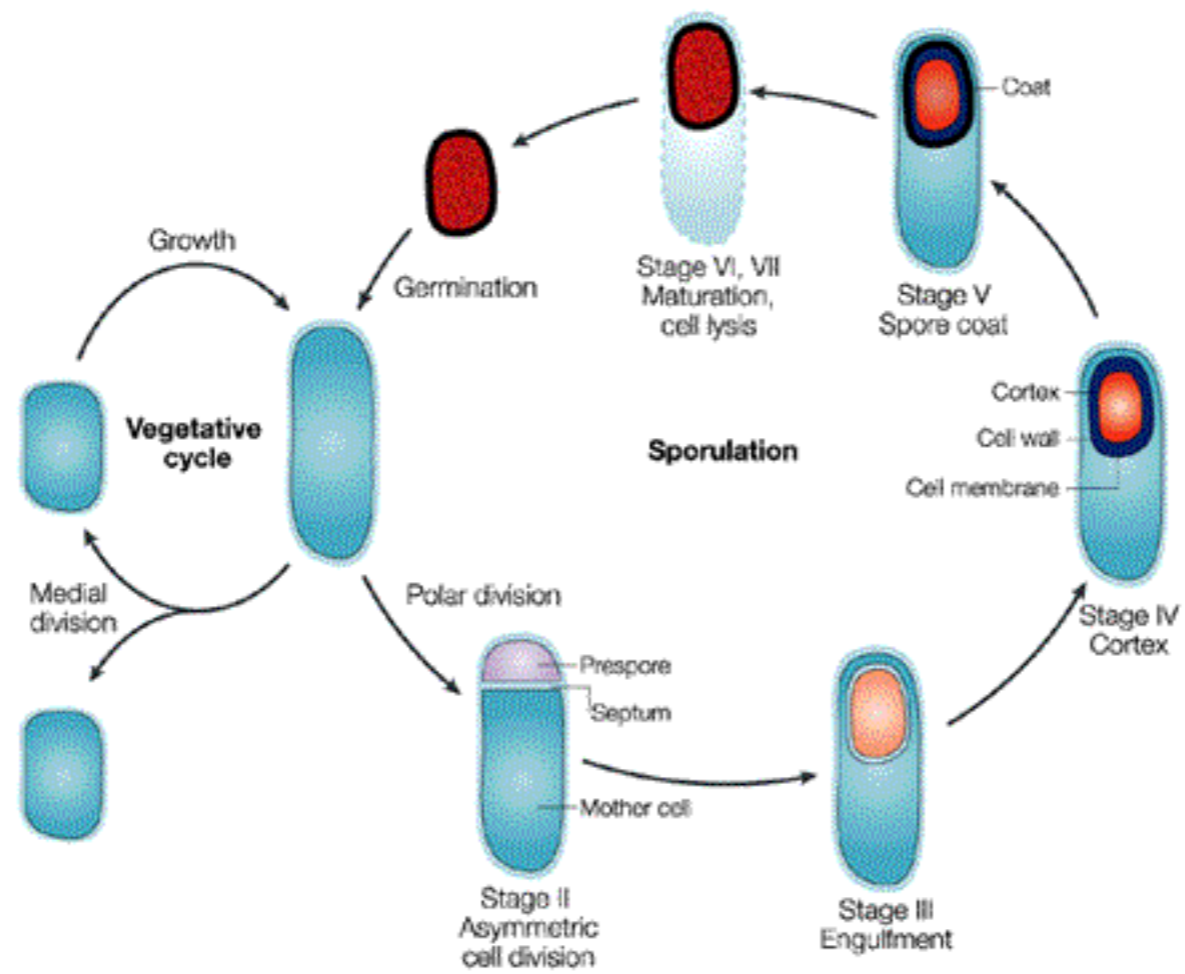


INTERLOCKED FFL

FFL is a strong motif in developmental networks.

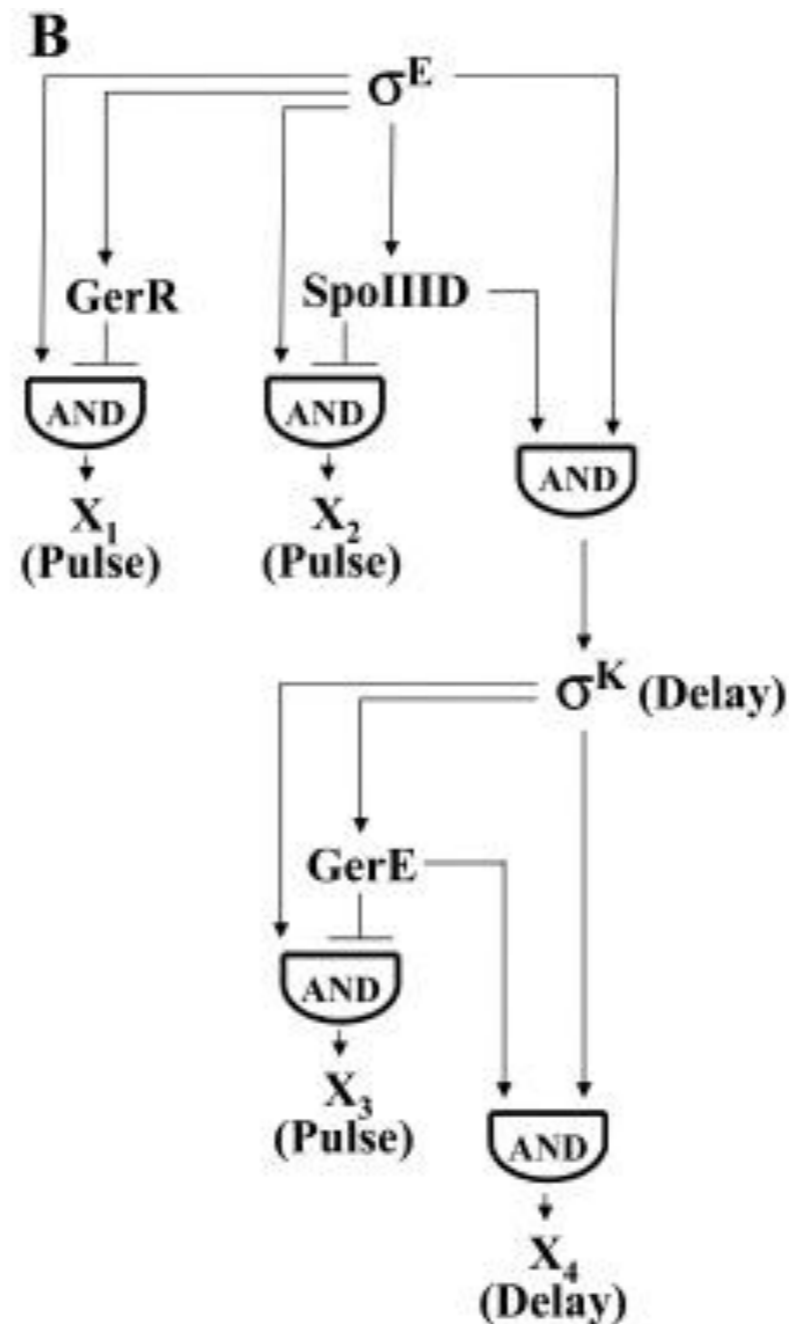


B. subtilis spore development



MOTHER CELL - TRANSCRIPTION NETWORK

The program consists of the activation and repression of 383 genes.



BACTERIAL BRAIN

