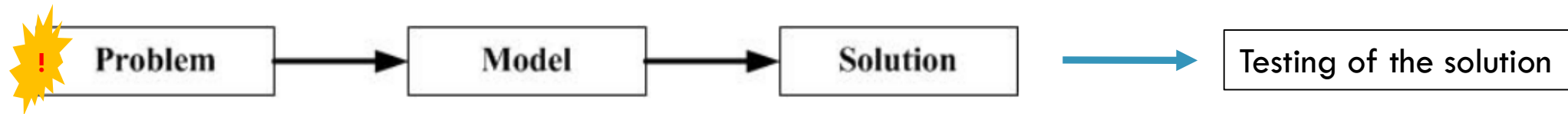


# **BOOLEAN MODELLING OF PSEUDOMONAS AERUGINOSA QUORUM SENSING AND VIRULENCE NETWORKS**

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# COMPUTATIONAL MODELS



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A model is a representation  
of reality

Mathematical **description** of the  
characteristics of a system

Metabolic  
Topological  
Boolean

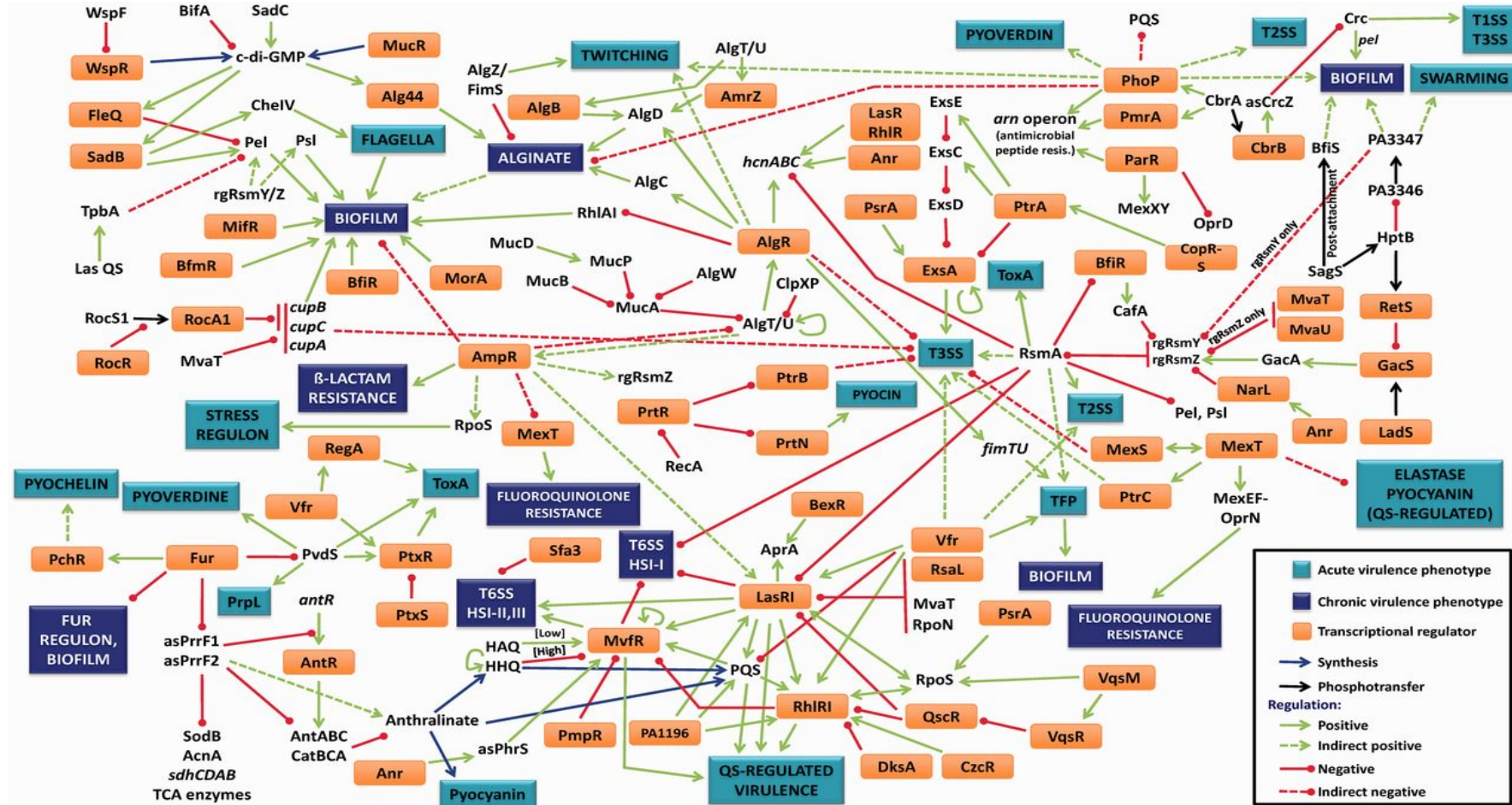
**Guide  
hypothesis**

# P. AERUGINOSA QUORUM SENSING AND VIRULENCE NETWORKS



Drugs that directly target the **growth** ability of the pathogens select for resistance.

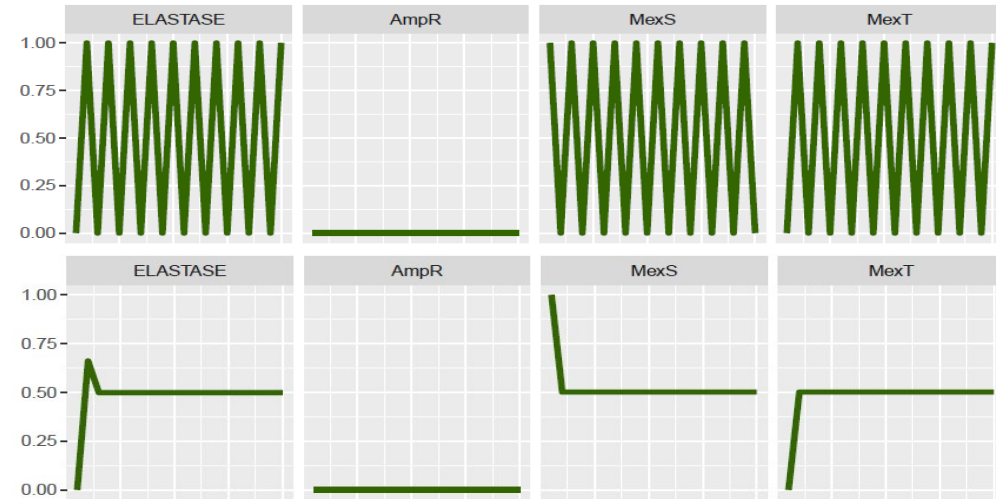
➤ Target on the **virulence** factors instead



# MECHANISTIC BEHAVIOUR AND RESPONSE STRATEGIES

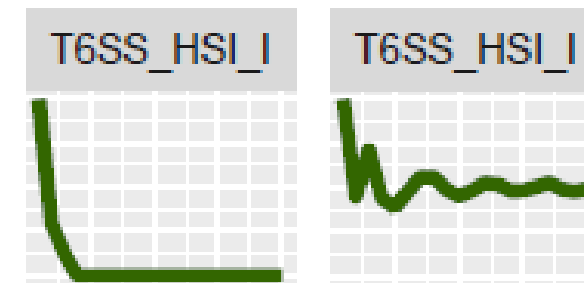
## Acute

- Strict repression of virulence phenotype
- Non-strict activation of virulence phenotype
- Oscillatory activation of virulence phenotype
- Sustained low activation of virulence phenotype
- Stochasticity effect on the network attractor space
- Combination of response strategies



## Chronic

- Strictly repressed with moderate virulence phenotype activation
- Non-strictly repressed with moderate virulence phenotype activation



MvfR deletion

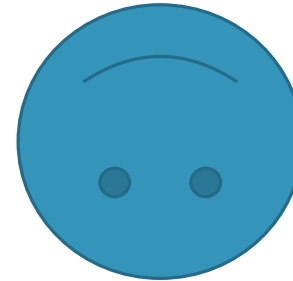
# EXPERIMENTAL VALIDATION

## Network inherent

- Dynamicity
- Stochasticity
- Resilience

*P. aeruginosa* single  
gene mutants  
library:

- High-throughput  
screening on 200  
conditions
- Non-targeted  
metabolome  
dataset



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