Introduction

- The starting point of this work:

Analysis of diverse regulatory networks in a hierarchical context shows consistent tendencies for collaboration in the middle levels

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- Motivation – most biological processes are regulated by a combination of different regulatory methods.

  → Study the interplay between these processes.

Agenda

Step 1

Recreate results in paper for the Sc_Tr and Sc_Ph networks:

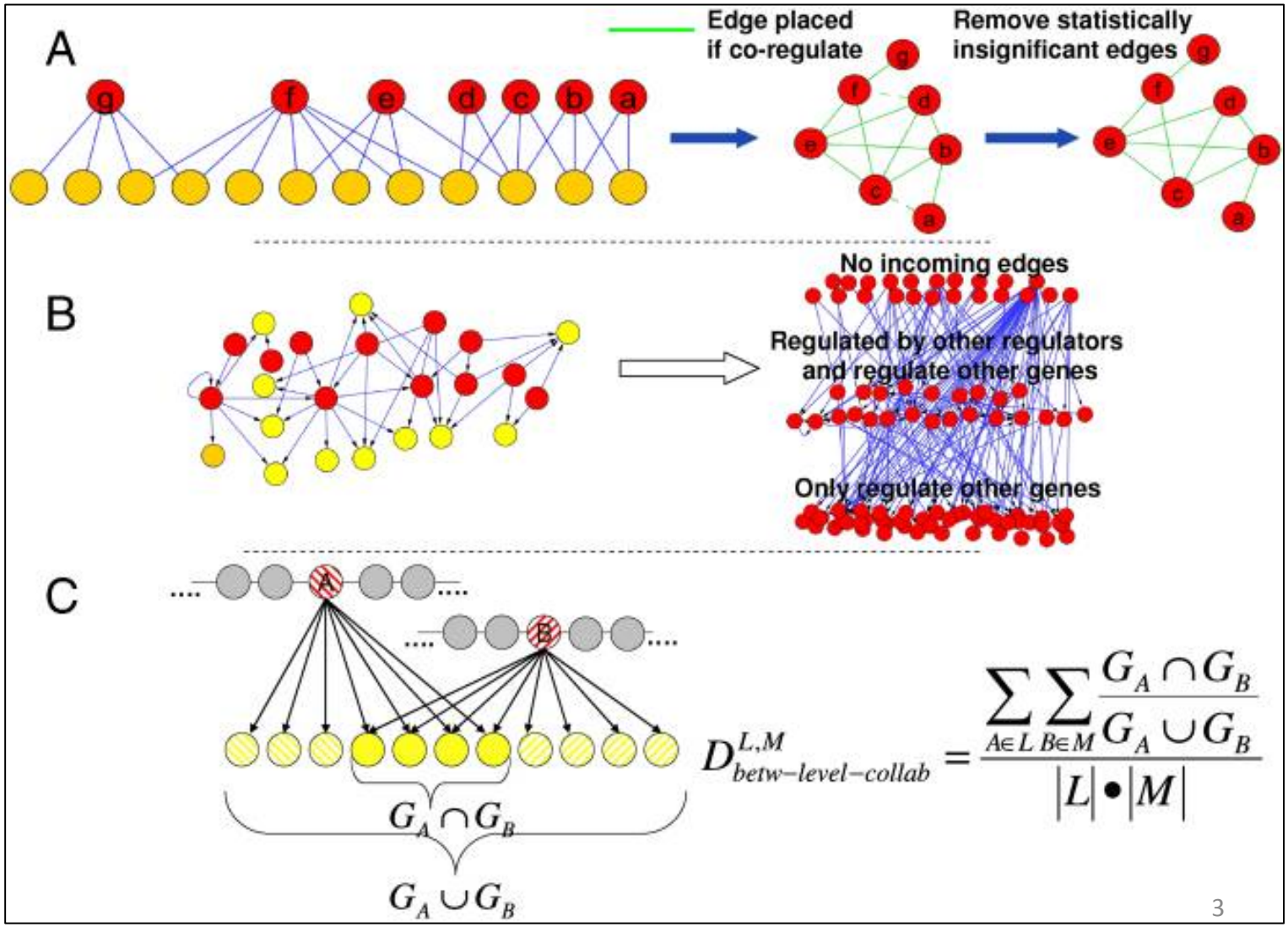
- hierarchy structure (3 layers per network)
- collaborative propensity for each layer
- **inter-layer degree of collaboration**

Method

regulatory network to co-regulatory network.

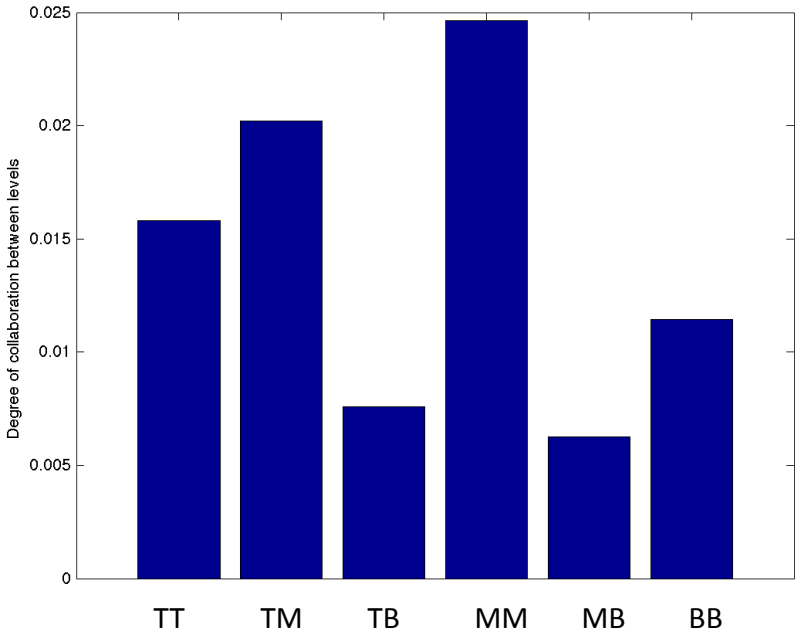
hierarchy structure (3 levels)

inter-layer degree of collaboration

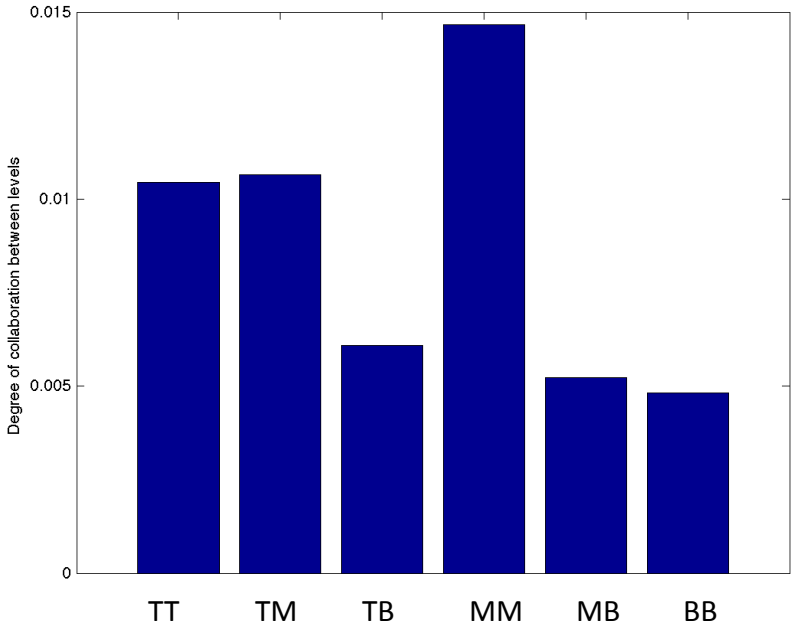


Between-level-collaboration results for yeast

Phosphorylation



Transcription



The middle level shows the highest collaborative propensity.

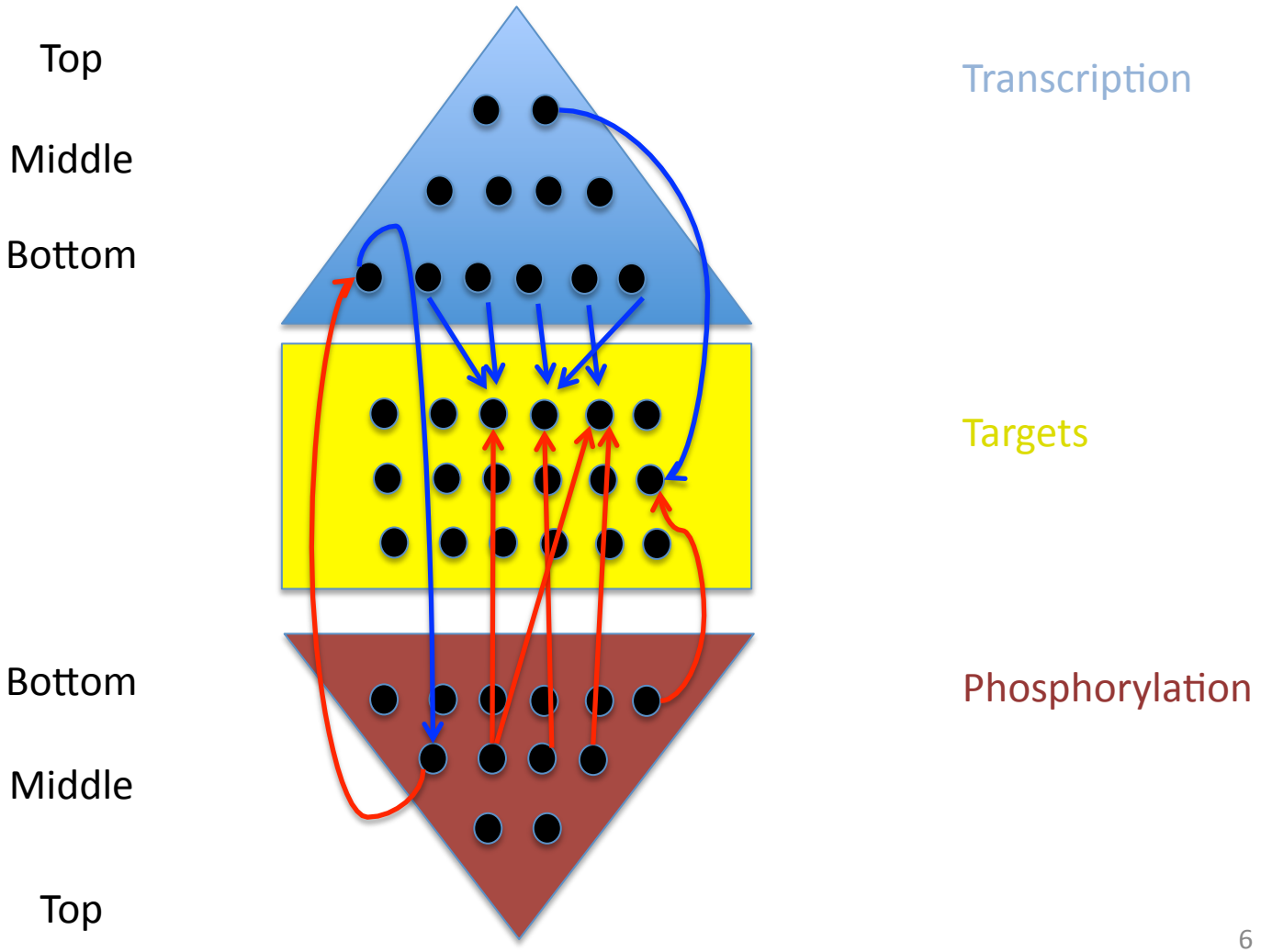
Step 2

Combine the two networks to obtain a 6-layer hierarchy and compute:

- collaboration propensity for each layer
- inter-layer degree of collaboration (9 cases):

$$\{T, M\ B\}_{TF} \times \{T, M\ B\}_{Ph}$$

TF and phosphorylation combined network

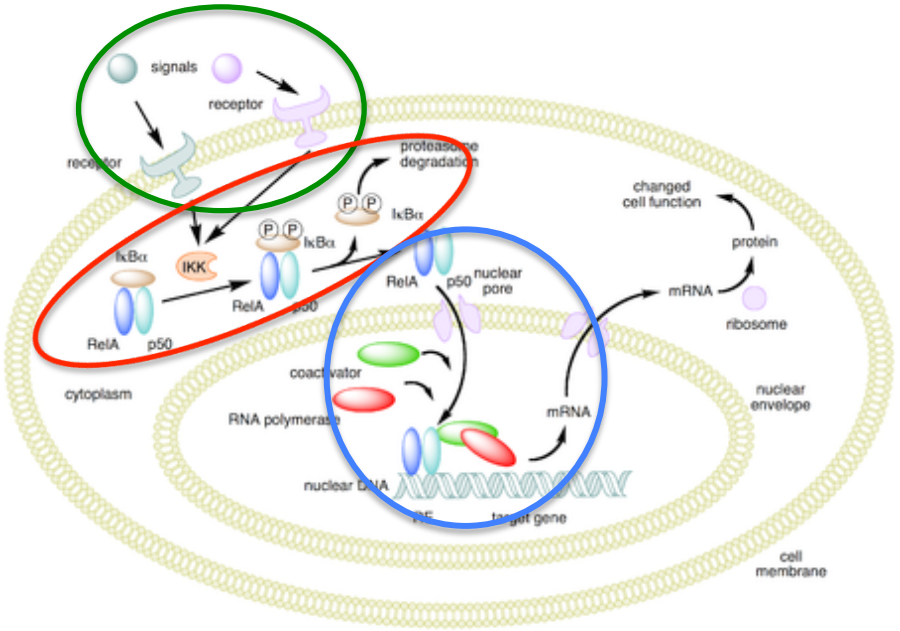


Step 3

Rationalize the trends found.

- Is there a common order in many regulation processes?
- Do the different trends / categories correlate to biological function?

NF-κB signaling



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Phosphorylation
Transcription