Mathematical modeling of metal ion homeostasis and signaling systems

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# The 1st Model for Yeast Calcium Homeostasis

## Introduction

## Methods

- Control Block Diagram
- Feedback Modeling
- Growth Modeling
- Protein Modeling
- Preliminary Model

## Results

- Steady-State Properties
- Transients and Mutant Behavior
- Parameter Sensitivity

## Discussion

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# Detection of A New Calcium Transporter on Yeast Plasma Membrane

## Introduction

## Methods

- Experimental Methods
- Mathematical Modeling
  - Control Block Diagram
  - Feedback Modeling
  - Volume Evolution Modeling (under Hypertonic Shock)
  - Protein Modeling
  - A Concise Model
  - Conversion to Aequorin Luminescence Unit (RLUs)
- Parameter Estimation Method

## Results

- Mg²⁺ Blocks Ca²⁺ Toxicity and Ca²⁺ Influx in Yeast
- Computational Modeling of Ca²⁺ Influx and Sequestration
  - Steady-State Properties
  - Transients and Mutant Behavior
  - Flux Analysis and Cell Volume Evolution
  - Extracellular Mg²⁺ Depletion and Ca²⁺ Challenge

## Discussion
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