MEAT

TECHSPEC REVIEW

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Impact

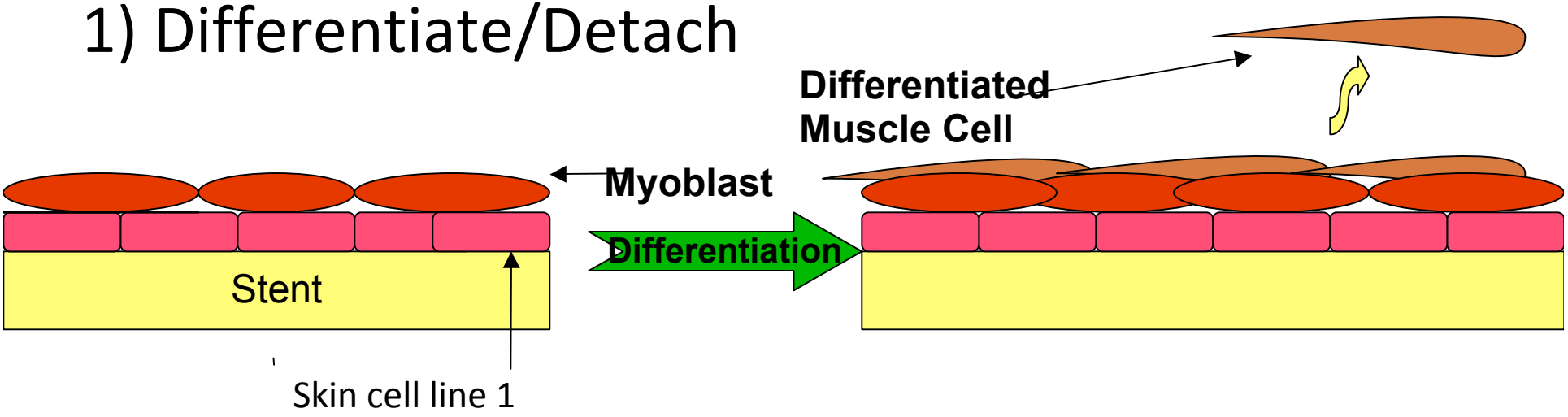
- Use of cattle as source of meat is highly resource demanding
- Methane gas emitted from cattle contributes to global warming
- Ethical issues with treatment of animals
- Presence of high levels of synthetic hormones and antibiotics in present-day meat
- Risk of contamination during development or slaughter

Purpose

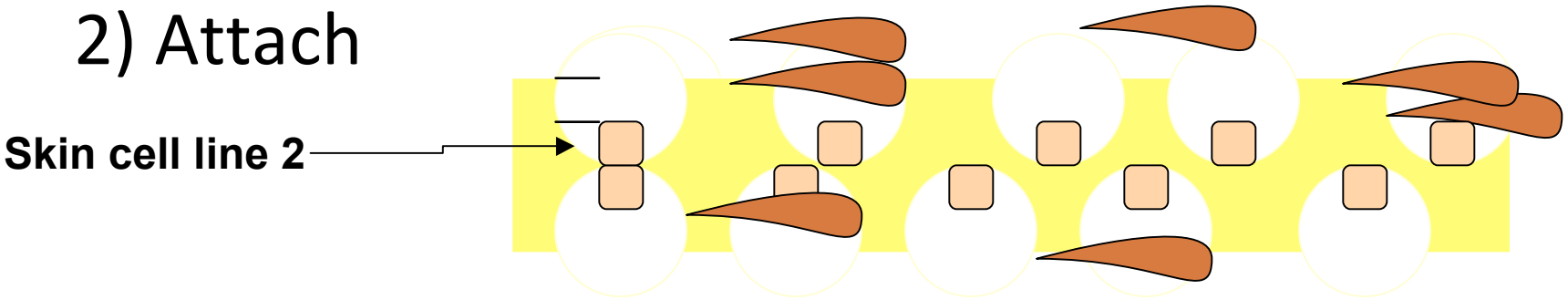
- Develop a procedure with tools from tissue engineering that allow for the construction of edible tissue that closely resembles the present-day meat product and addresses nutritional and safety concerns

3 Step Process

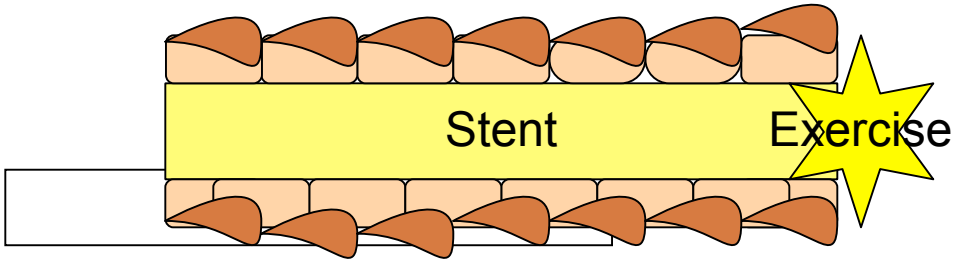
1) Differentiate/Detach



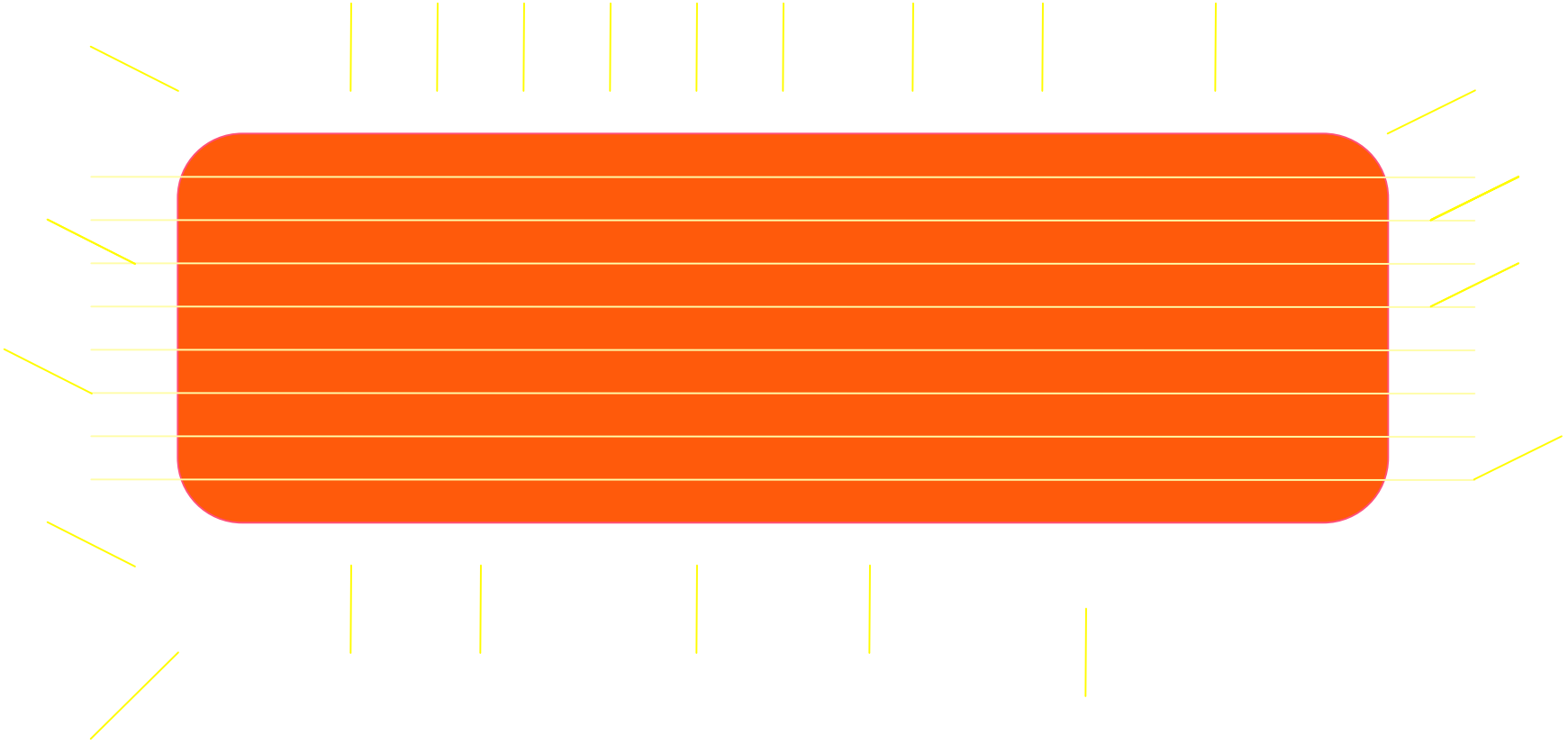
2) Attach



3)Exercise



FINAL PRODUCT



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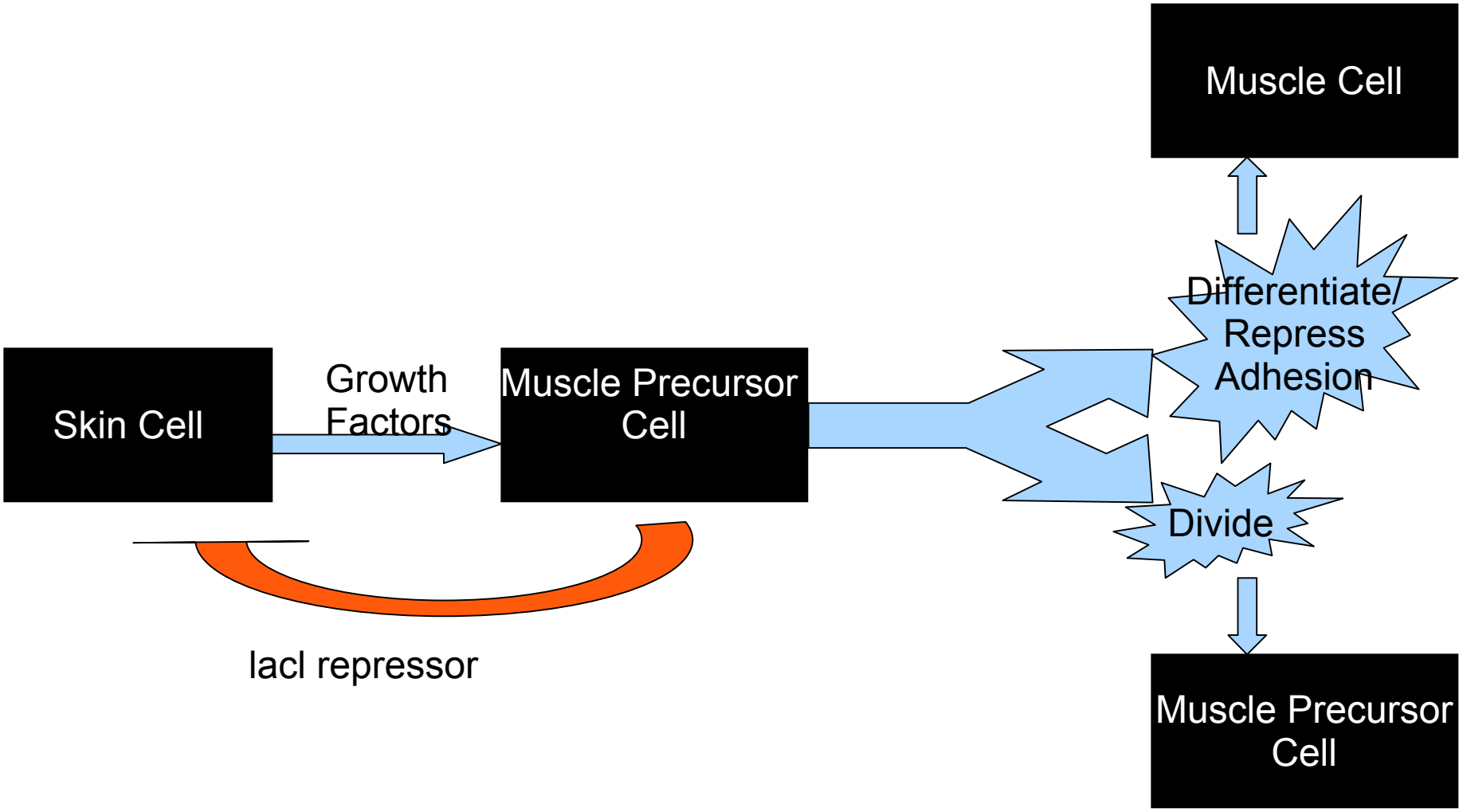
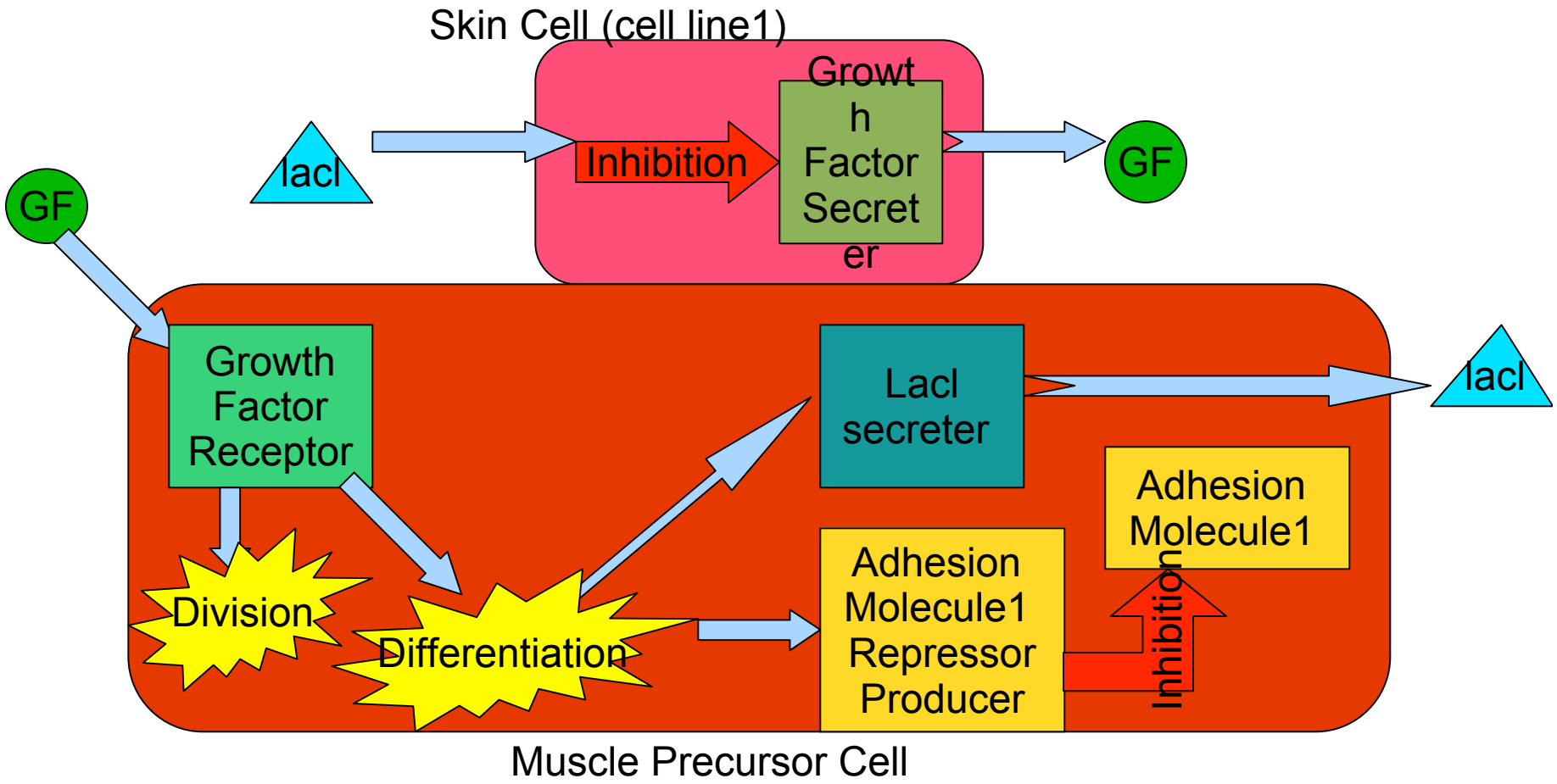
System and Device Overview

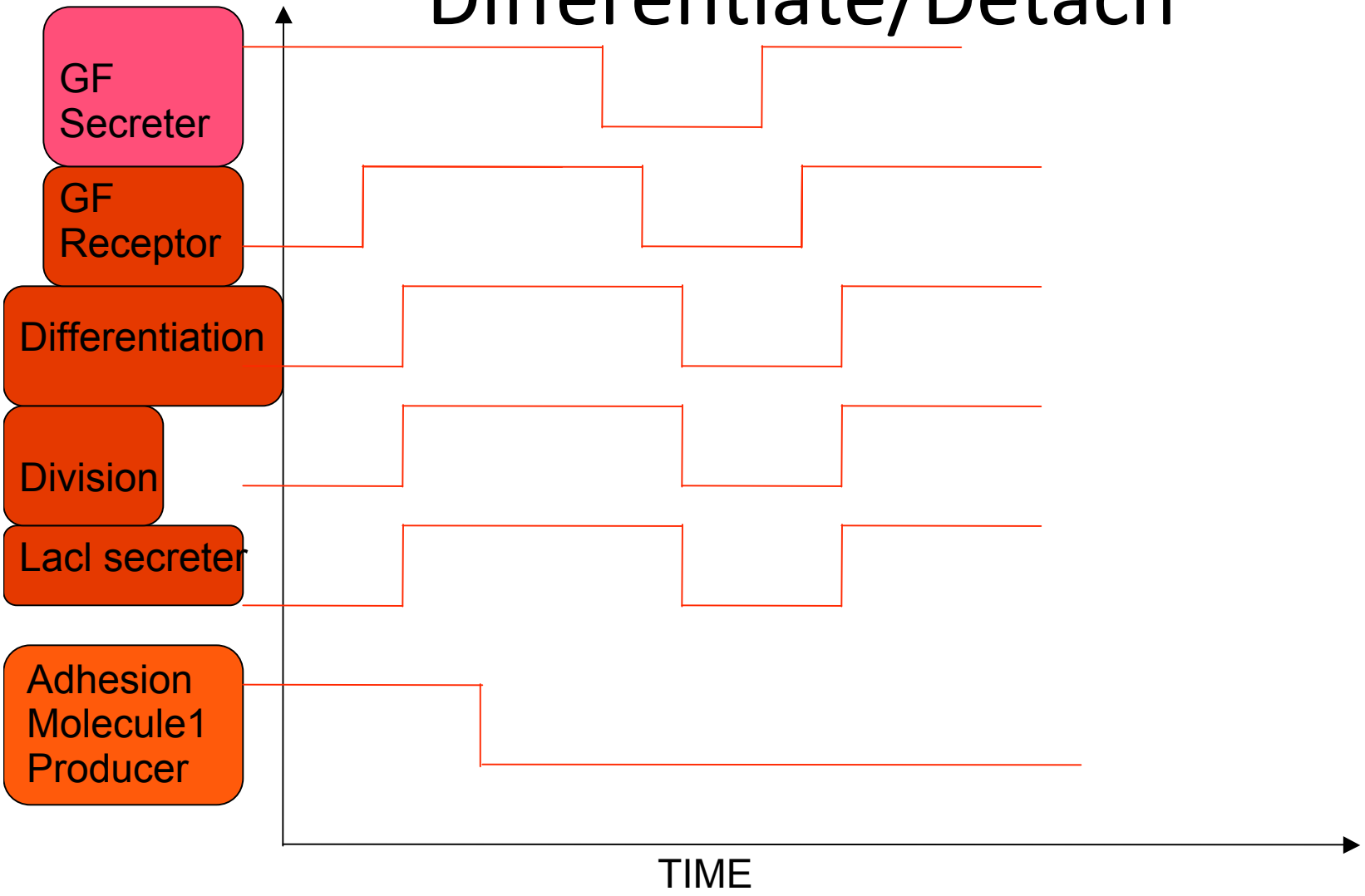
Differentiate/Detach



Differentiate/Detach



Differentiate/Detach



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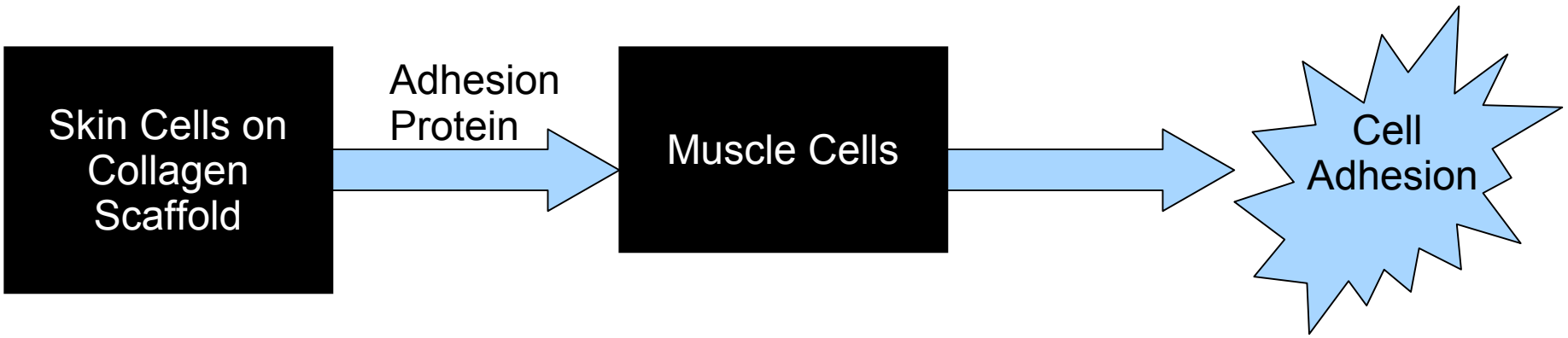
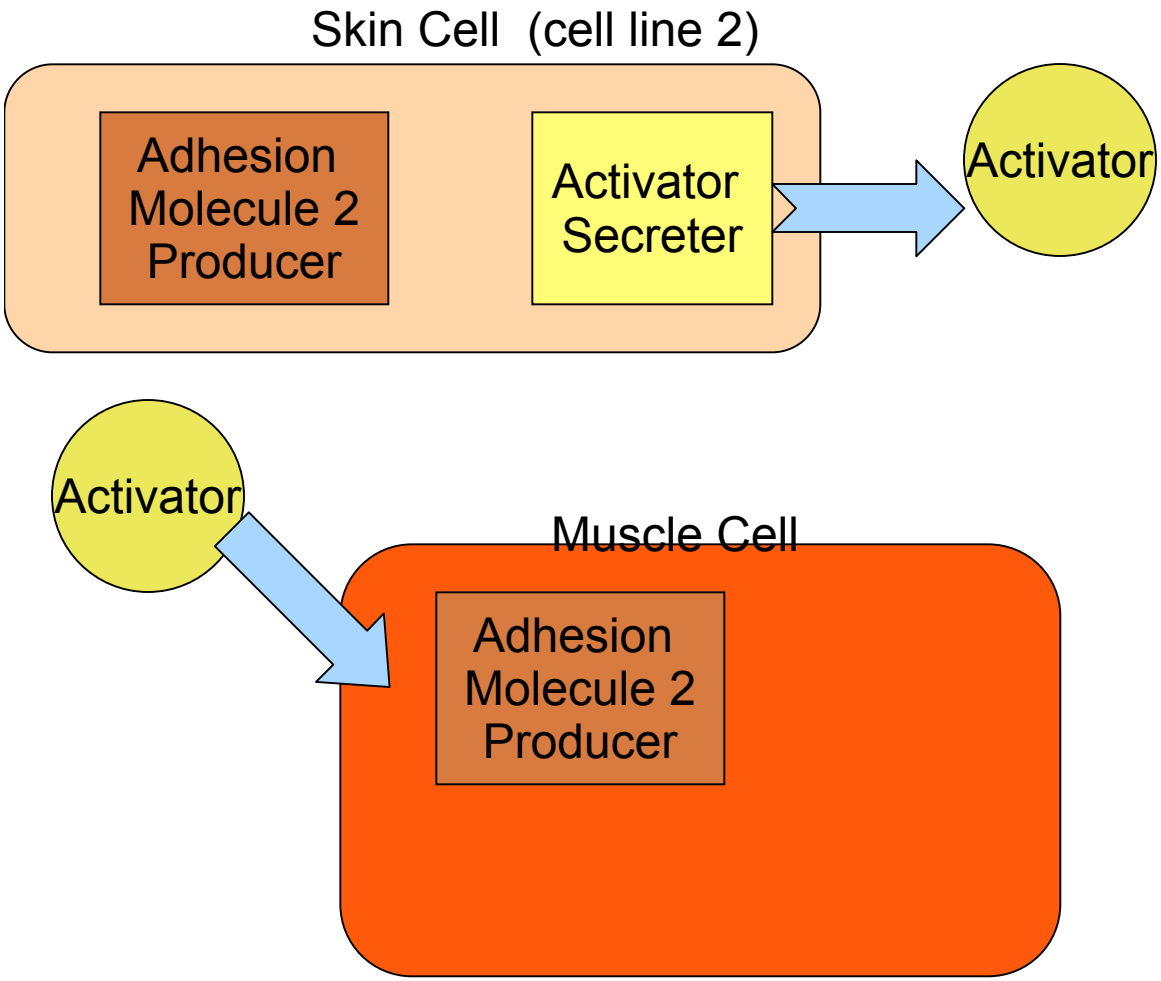

Skin Cells on Collagen Scaffold
Adhesion Protein
Muscle Cells
Cell Adhesion

Attach


Skin Cell (cell line 2)
Adhesion Molecule 2 Producer
Activator Secreter
Activator
Activator
Muscle Cell
Adhesion Molecule 2 Producer

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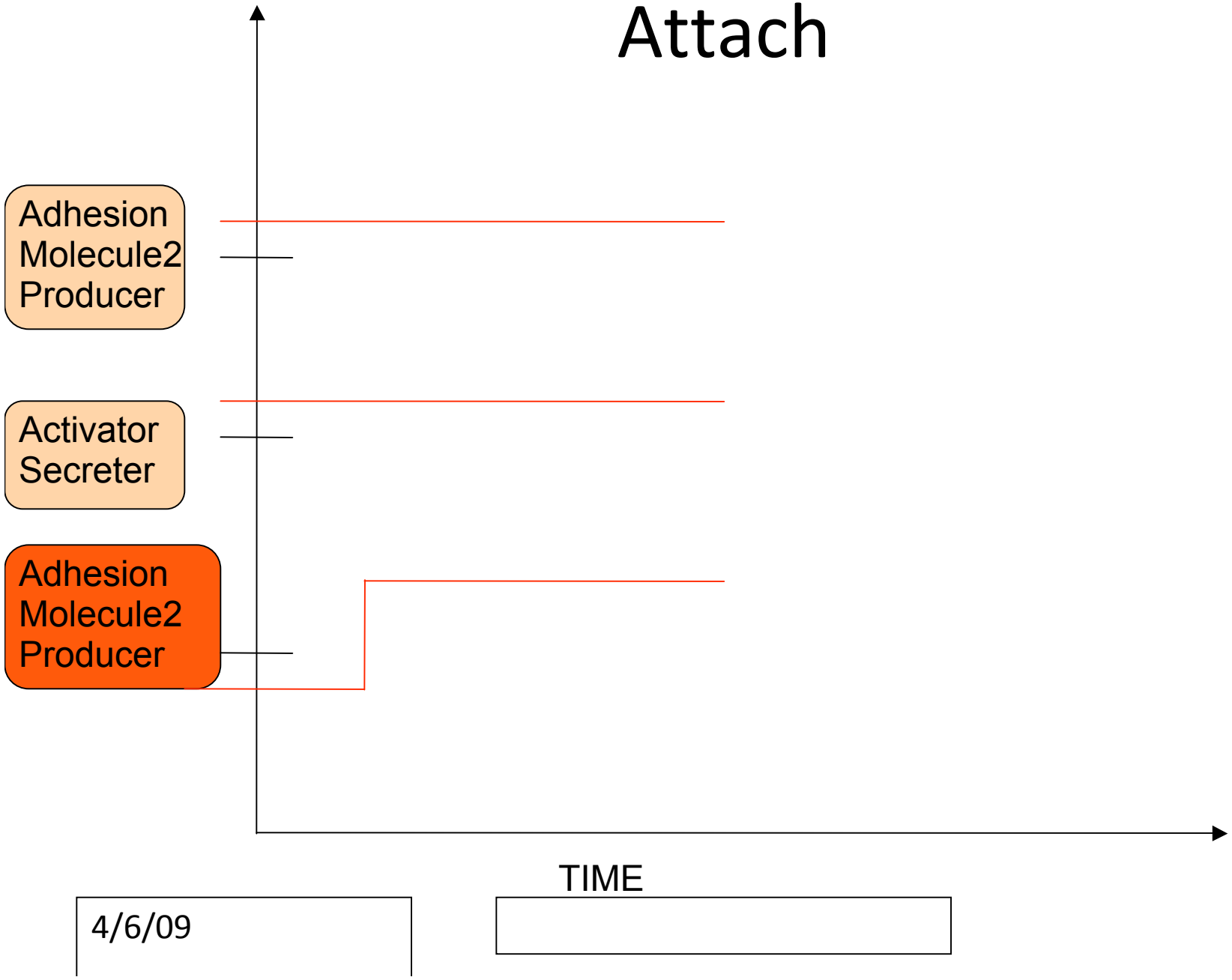
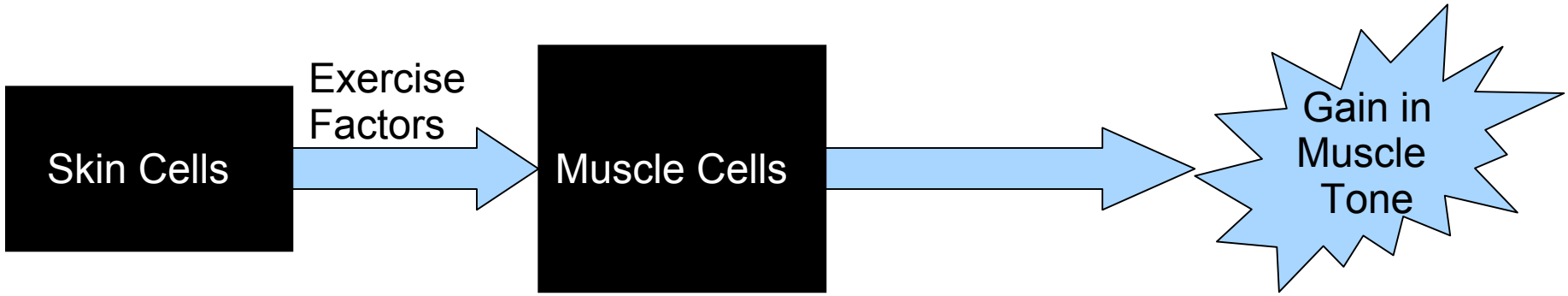
Attach


Adhesion Molecule2 Producer
Activator Secreter
Adhesion Molecule2 Producer
TIME

Exercise



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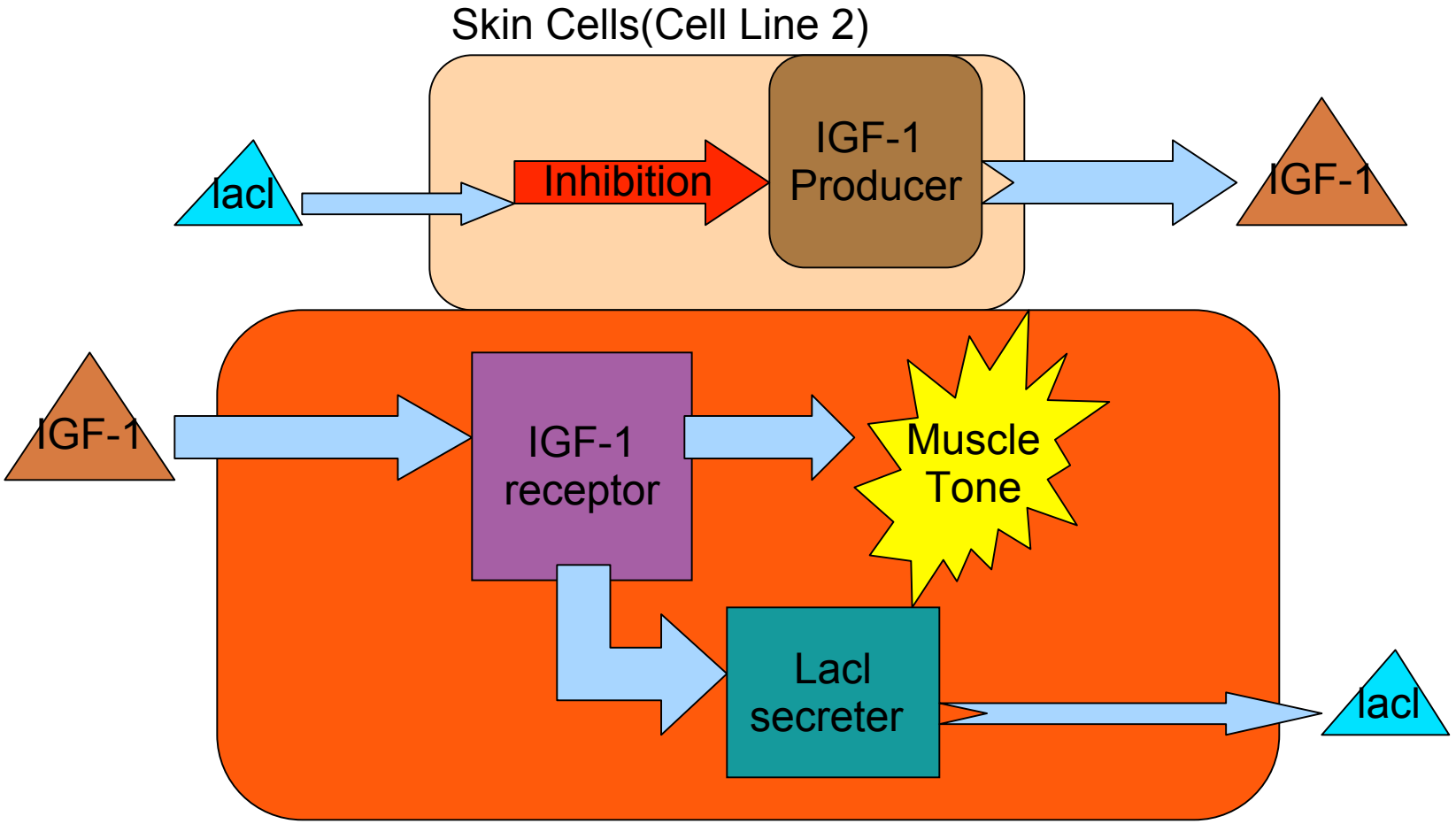
Exercise



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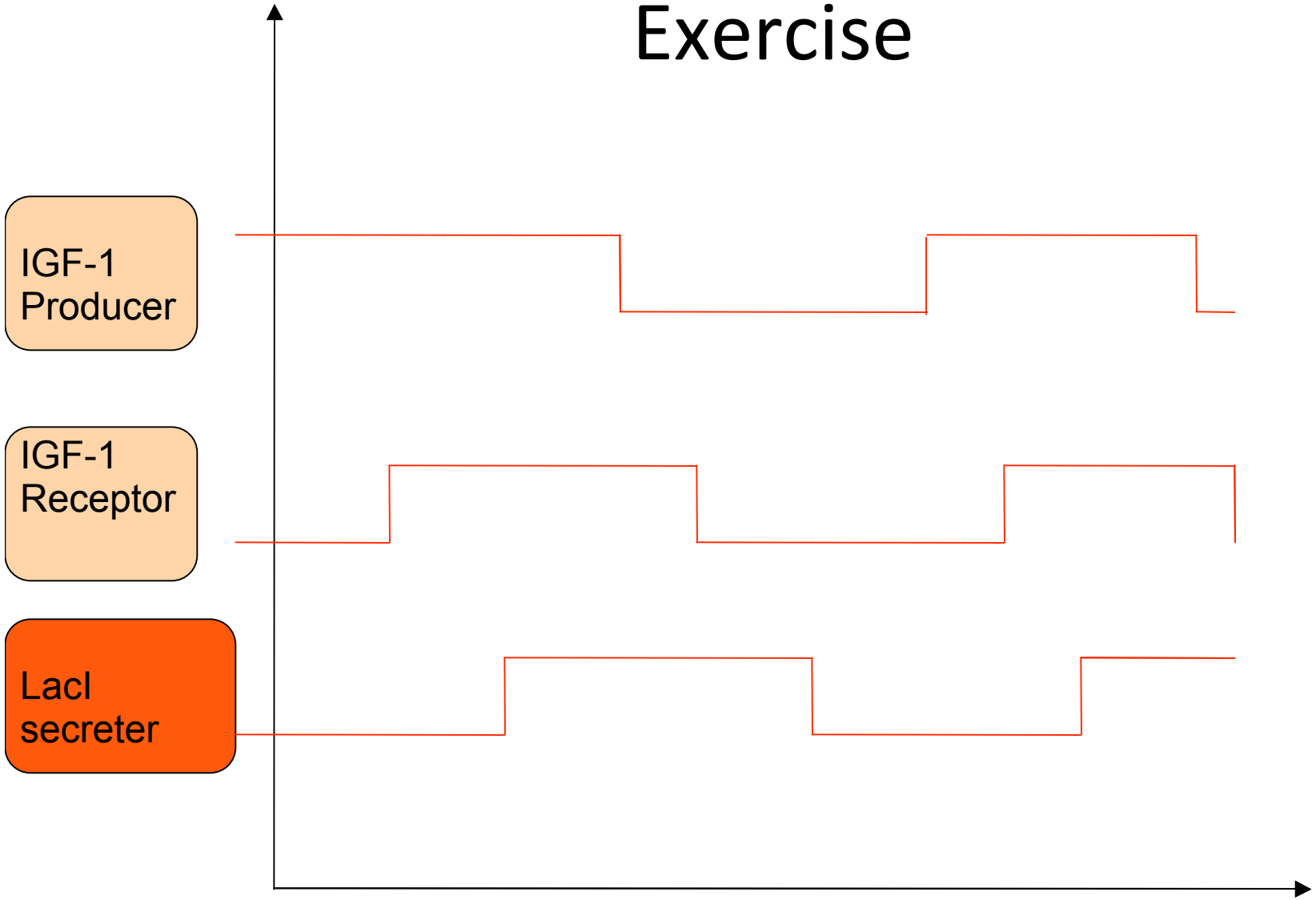
Exercise



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PARTS

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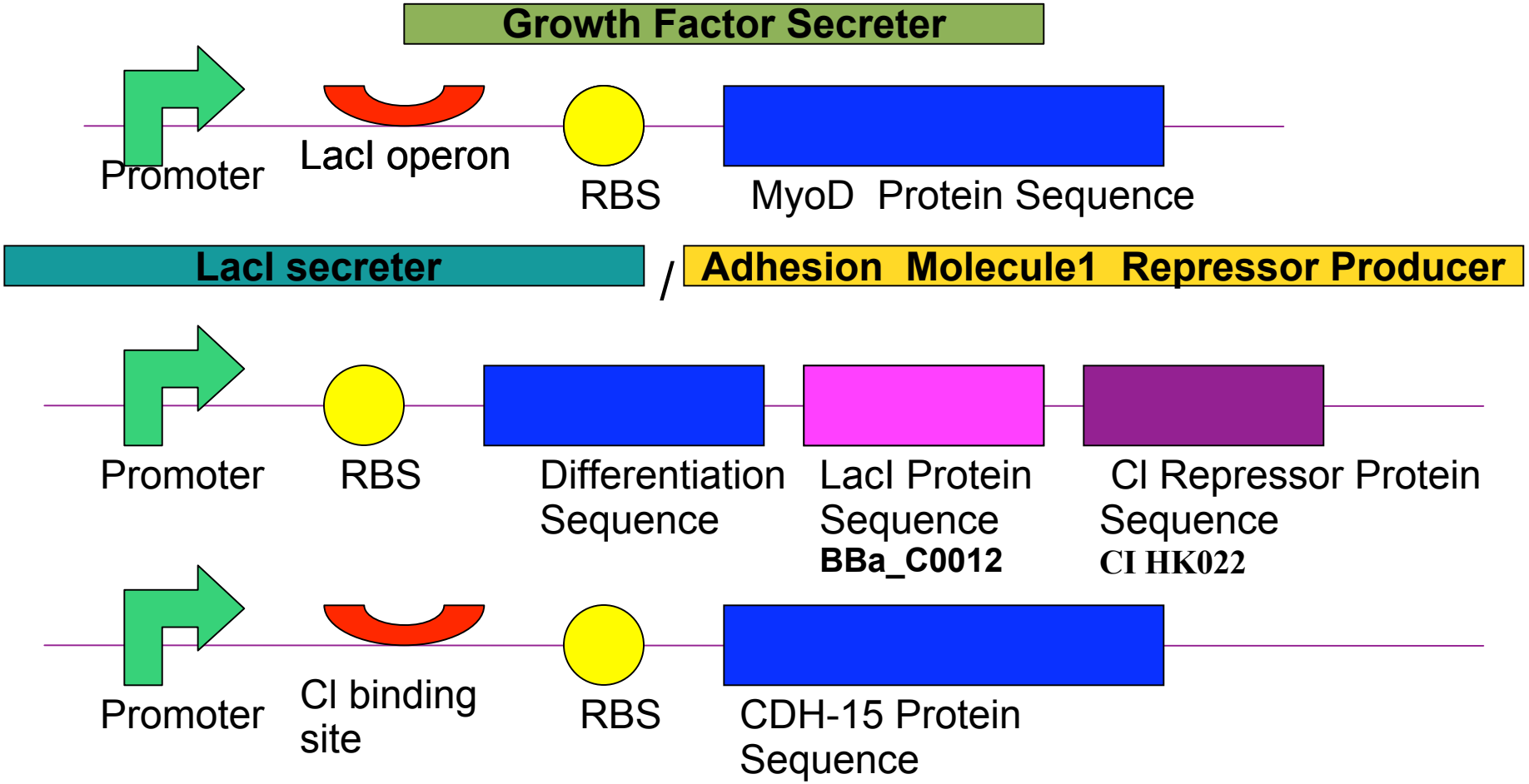
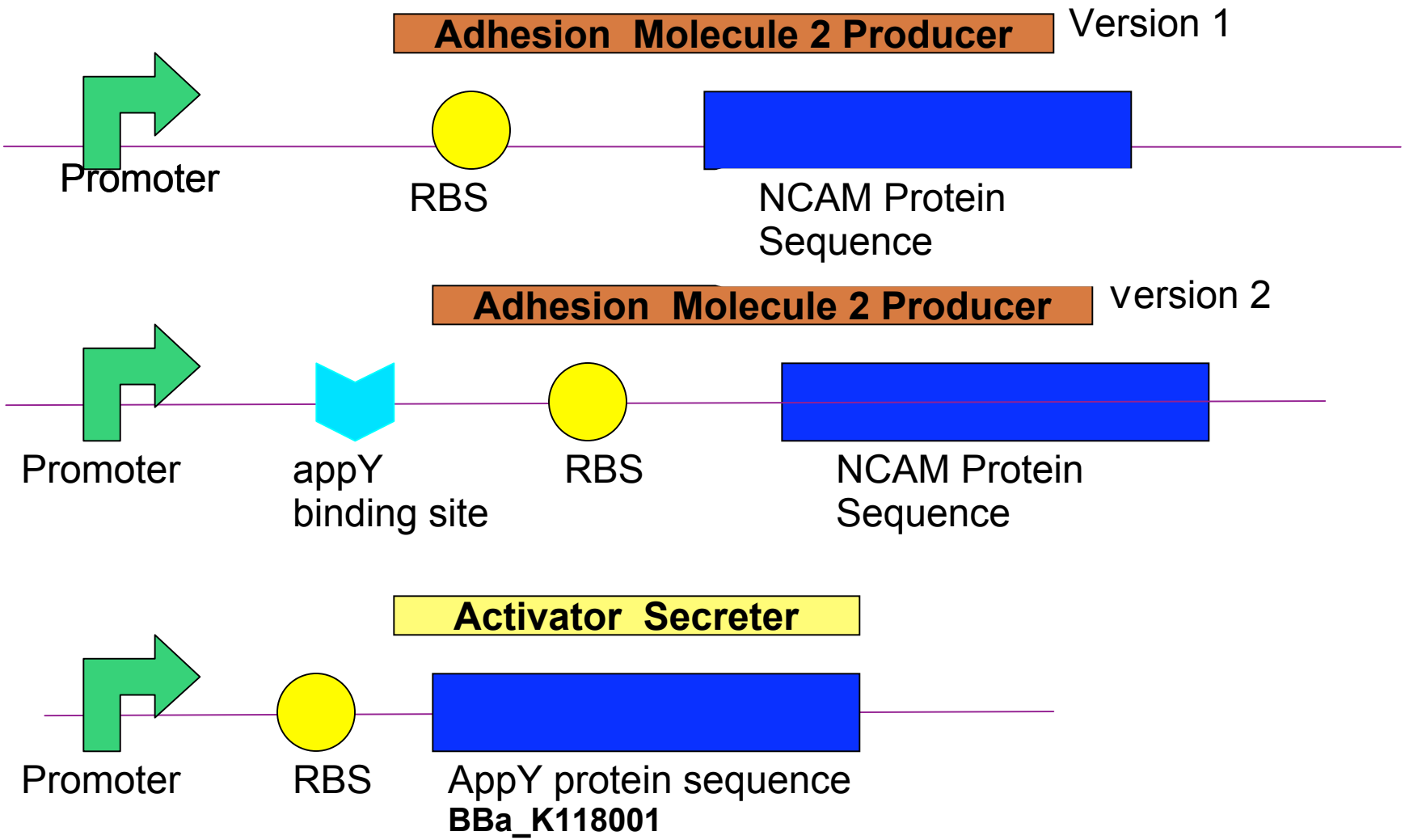
Differentiate/Detach



Attach


Adhesion Molecule 2 Producer
Version 1
Promoter
RBS
NCAM Protein Sequence
Adhesion Molecule 2 Producer
version 2
Promoter
appY binding site
RBS
NCAM Protein Sequence
Activator Secreter
Promoter
RBS
AppY protein sequence
BBa_K118001

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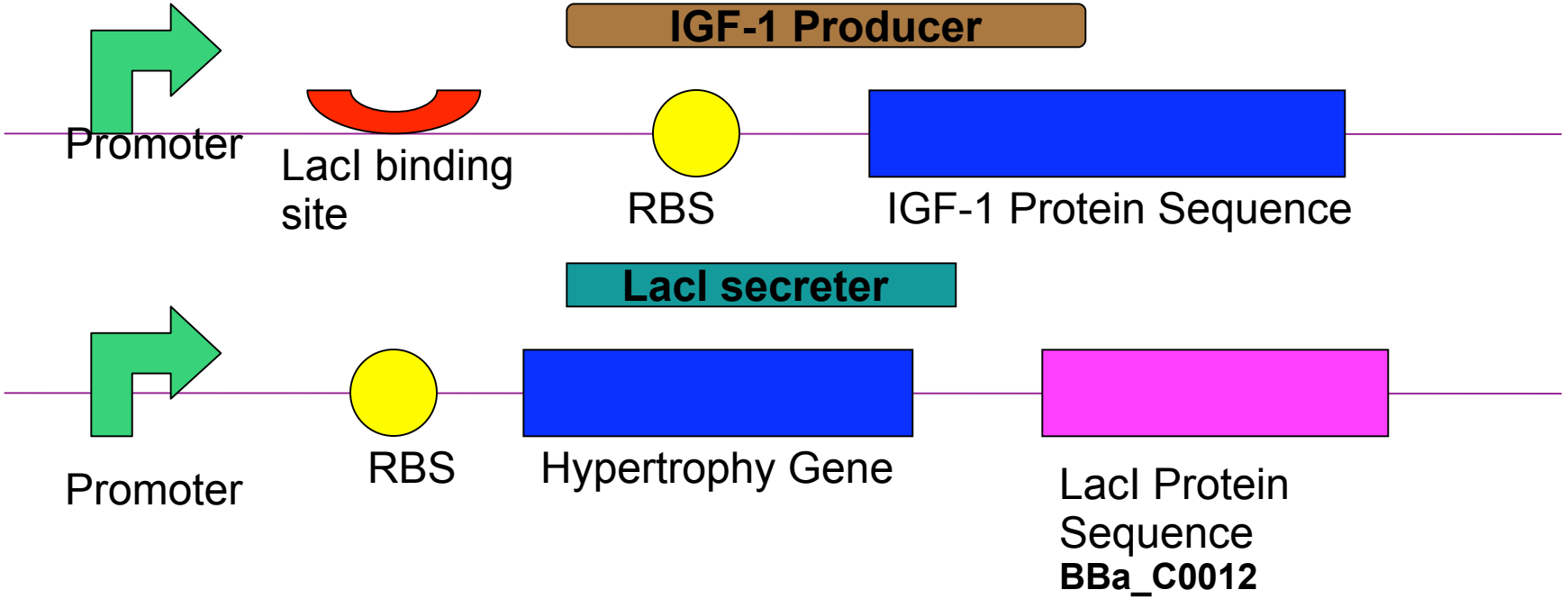
Exercise


IGF-1 Producer
Promoter
LacI binding site
RBS
IGF-1 Protein Sequence
LacI secreter
Promoter
RBS
Hypertrophy Gene
LacI Protein Sequence
BBa_C0012

Testing/Debugging

- Differentiate/Detach: Removal of differentiating system and comparison of before/after muscle cell concentration
- Attach: Attachment of muscle cells to collagen scaffold indicates system working
- Exercise: Compare to non-stimulated muscle cells

Unknowns and Possible Issues

- Yield of procedure?
- Percentage of floating muscle cells harvested?

Open Issues

- Bioreactor or not?
- Different pathways?

Go or No Go?

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