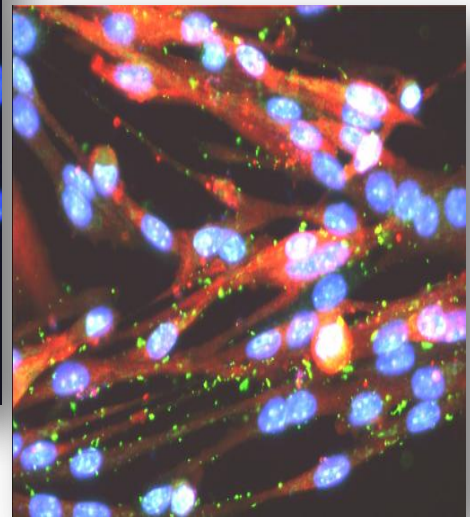
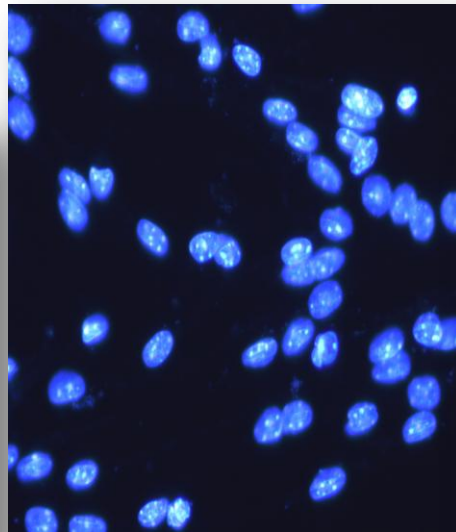
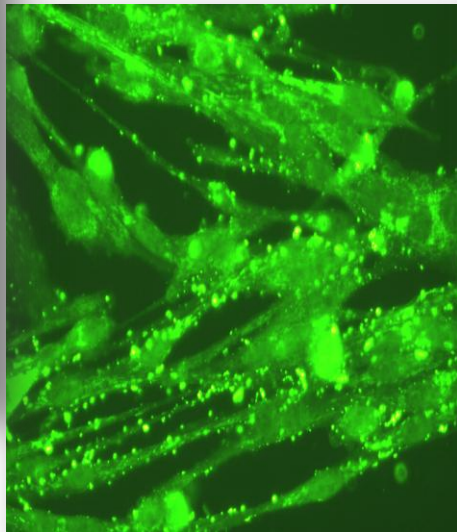
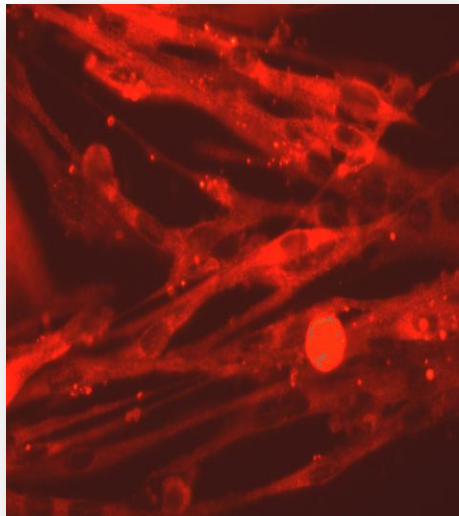


CD24 induced muscular regeneration: Unraveling the mystery behind satellite cell differentiation

Life Sciences

Evan Chen-Wayzata High School



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Atsushi Asakura

-Qualified Scientist

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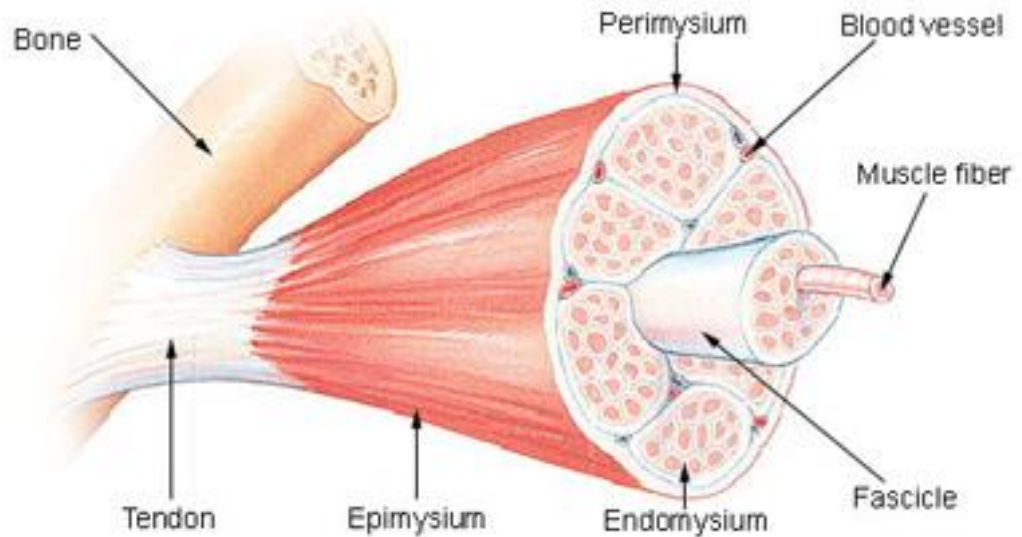
-Designated Supervisor

Princesa VanBuren

-Science Mentorship Advisor

Muscular Dystrophy

- Symptoms
- Prognosis
- Muscular Dystrophy



-Duchenne Muscular Dystrophy Disease

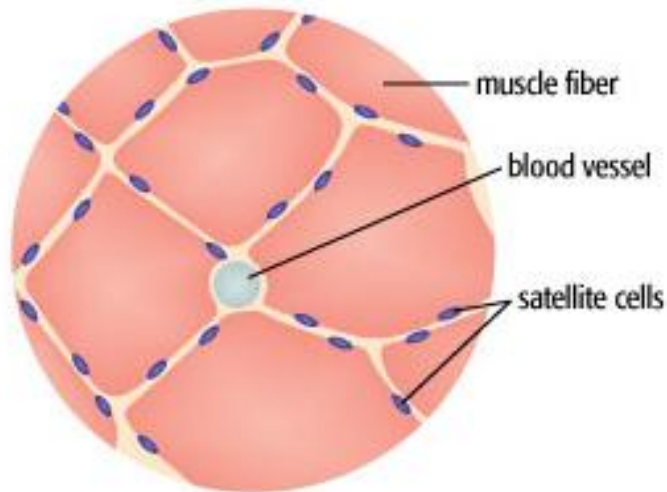
Satellite Cells & CD24

Satellite Cells

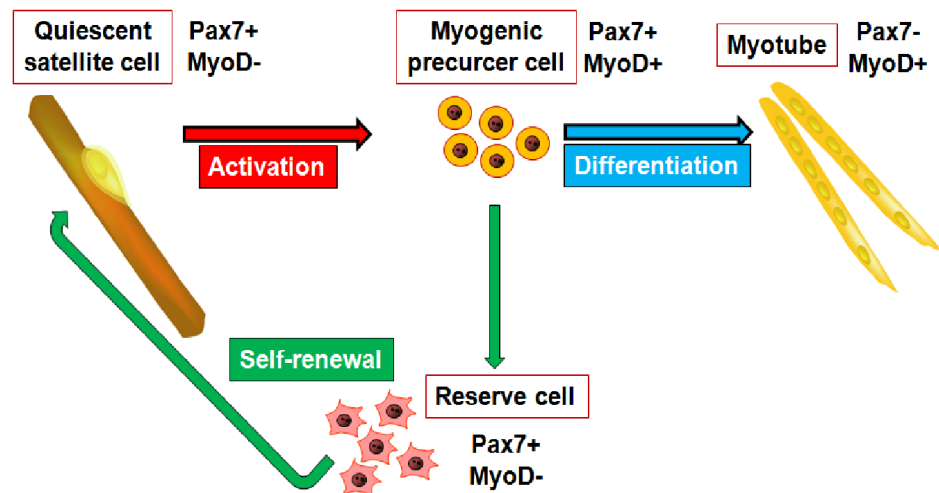
-Location

-Function

Current research



Satellite cell activation, differentiation and self renewal



CD24

-Characterization

-Current research

Purpose

To determine CD24 expression in myogenic differentiation and analyze overexpression of the CD24 gene in myoblasts will affect differentiation and growth rates.

Hypothesis

CD24 will be expressed in all stages of myogenic differentiation and recombinant DNA will be a useful tool to study its overall function in muscle regeneration:

- 1) CD24 will be expressed at all levels of myogenic lineage
- 3) CD24 overexpression will increase differentiation rates in myoblasts

Research Design

CD24 Detection



CD24 Functional Analysis



In vivo modeling



Clinical implants

CD24 Detection

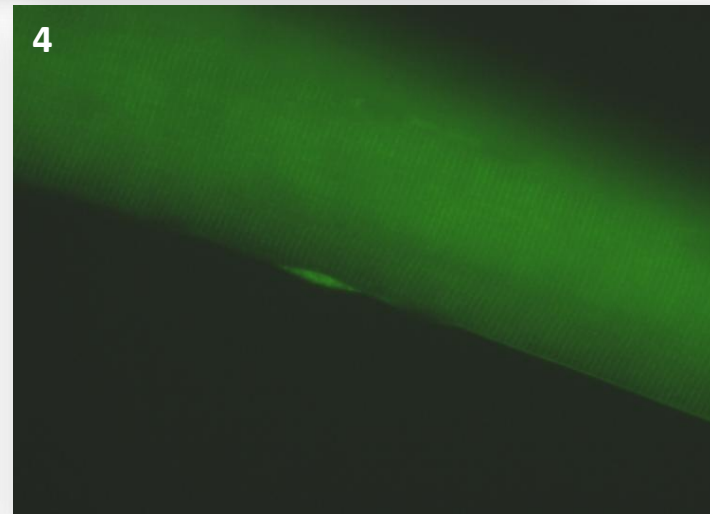
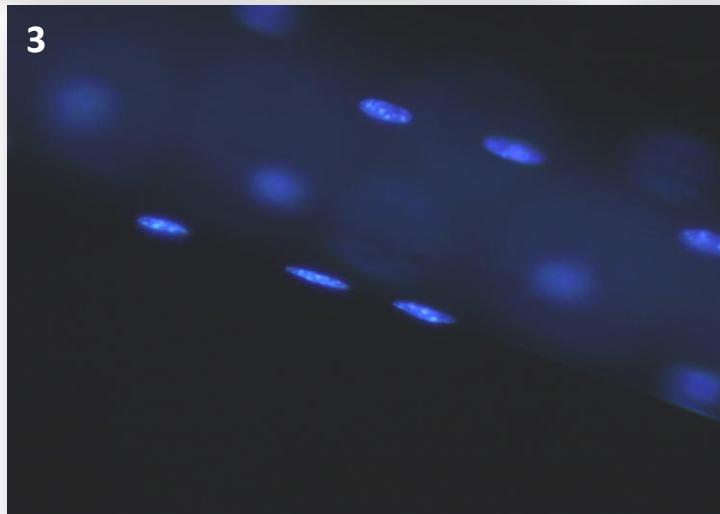
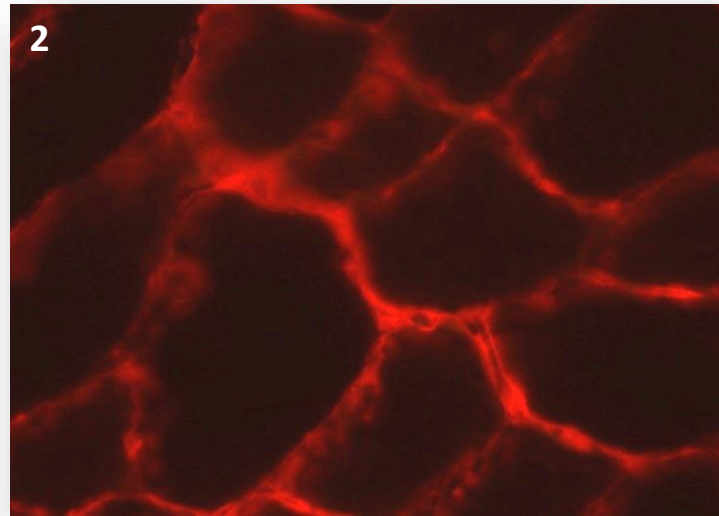
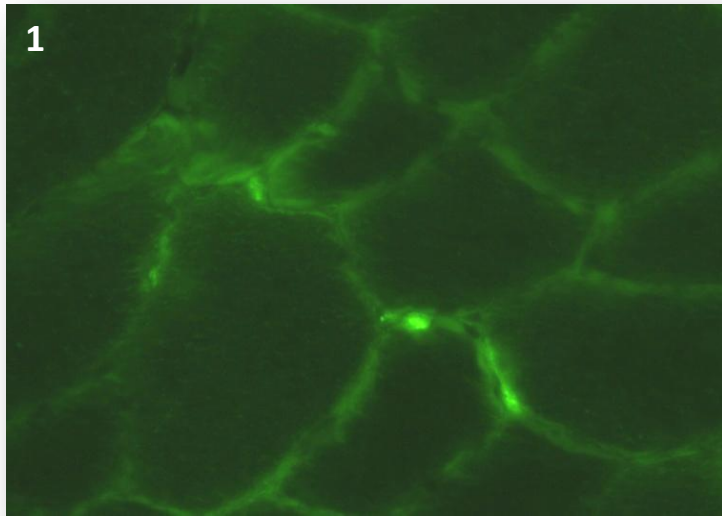
Quiescent Satellite Cell Staining

- Primary antibody staining
 - Tibialis Anterior
 - CD24 & Laminin
 - Pax7 & MyoD

Magnetic Cell Separation Columns

- Isolation
 - Negative markers: anti-CD45, CD31, Sca-1 antibodies
 - Positive markers: Integrin7, CD24
- Detection
 - MyoD & CD24

CD24 Detection



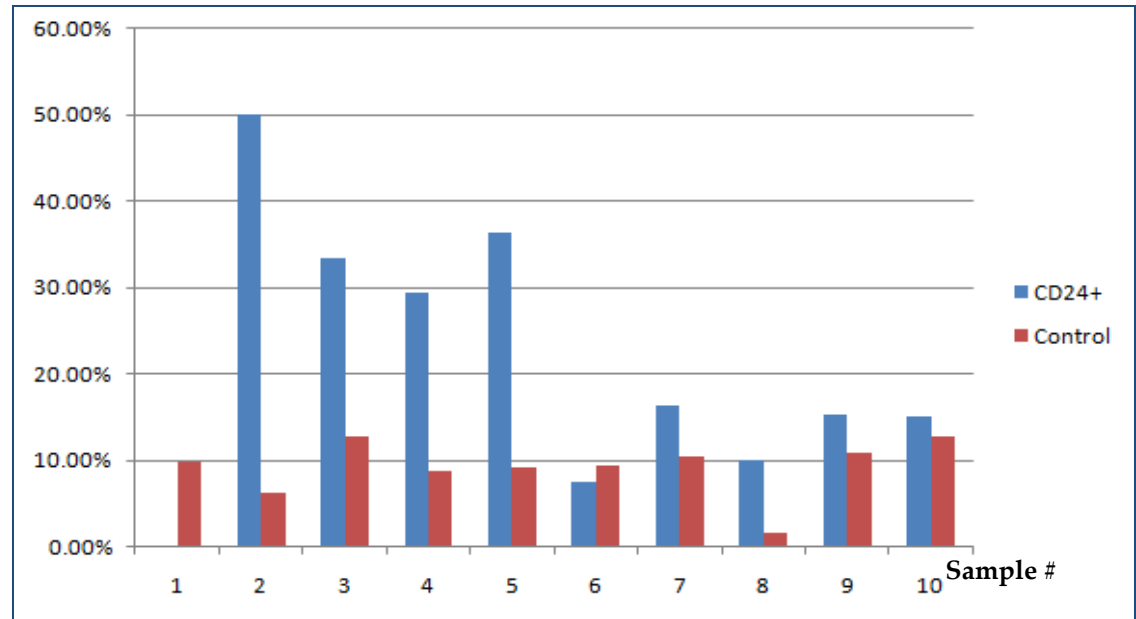
CD24 Overexpression

Vector

- Recombinant DNA
 - Ligation
 - Transfection
 - Infection

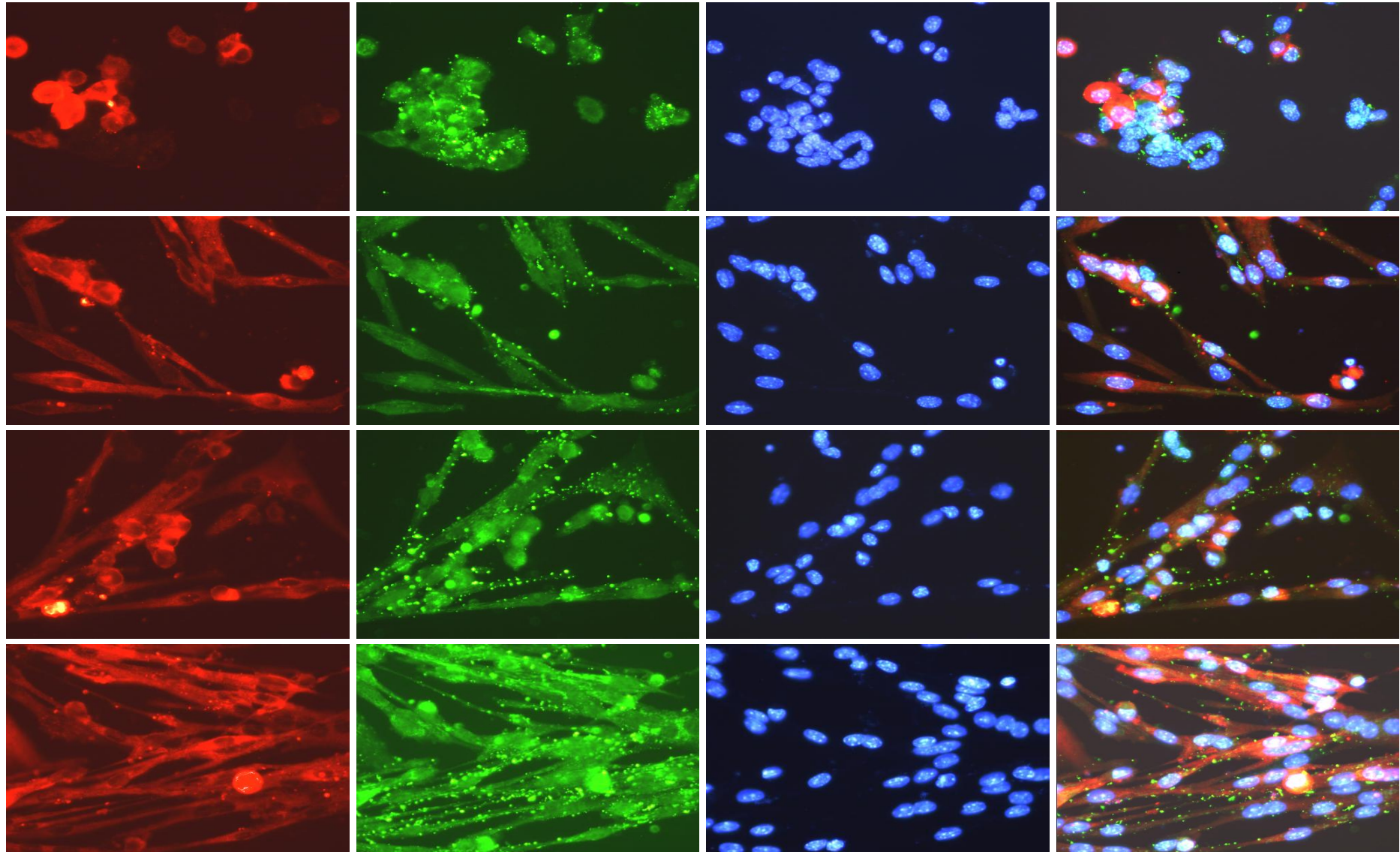
Analysis

- Incubation
 - Day 0,2,4,6,8
- Detection
 - CD24 & MHC



CD24	Sample1	Sample 2	Sample 3	Sample 4	Sample 5	Sample 6	Sample 7	Sample 8	Sample 9	Sample 10
MHC+ & CD24+	0	4	6	5	4	3	7	1	4	3
CD24+	2	8	18	17	11	40	43	10	26	20
pMXs	Sample1	Sample 2	Sample 3	Sample 4	Sample 5	Sample 6	Sample 7	Sample 8	Sample 9	Sample 10
MHC+	8	5	10	6	3	4	3	1	4	10
CT	81	81	78	57	34	43	32	63	37	78

CD24 Overexpression



Conclusion

Detection

- **Quiescent**
-Negative
- **Activated**
-Positive

CD24	Day 0 Ave.	Day 2 Ave.	Day 6 Ave.	Day 8. Ave
(MHC+ & CD24+)/ CD24+	21.33%	67.21%	86.13	90.89%
pMXs	Sample1	Sample 2	Sample 3	Sample 4
MHC+/CT	9.21%	43.76%	64.05	77.69%
P =	0.0256	0.00653	0.00536	0.00191

Overexpression

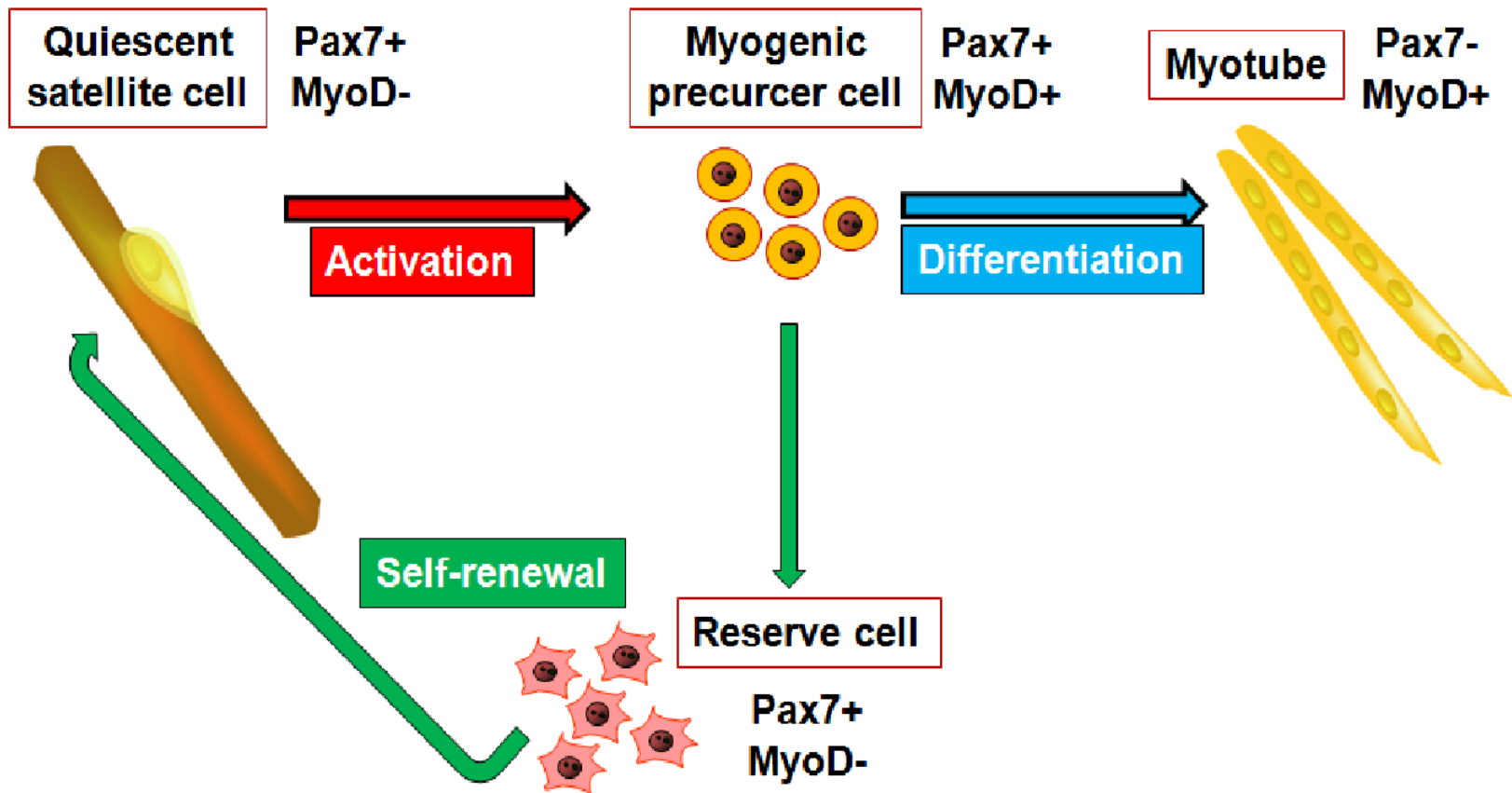
- **Positive Control**
-CD24 overexpression
- **Negative Control**

CD24 Expression



Myoblast Differentiation

Satellite cell activation, differentiation and self renewal



Future Work

- **What controls CD24 expression during differing stages of myogenic differentiation?**
- **Will *in vivo* modeling yield different results?**
- **Will different techniques of detection show different CD24 expression results?**
- **Are the differentiation steps between myogenic lineage steps distinct mechanisms?**

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