

RECOVERY: LOOKING FORWARD TO THE NEXT MATCH

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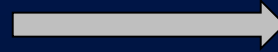


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The Congested Calendar...

USA vs Portugal
Sunday, June 22

3 days



USA vs Germany
Thursday, June 26

Virginia Tech at Miami
Thursday, Oct 9

2 days



Virginia Tech at FSU
Sunday, Oct 12

NR United vs Richmond Strikers
Saturday, May 24 (9:00)

3-4 hours



NR United vs Virginia United
Saturday, May 24 (2:00)

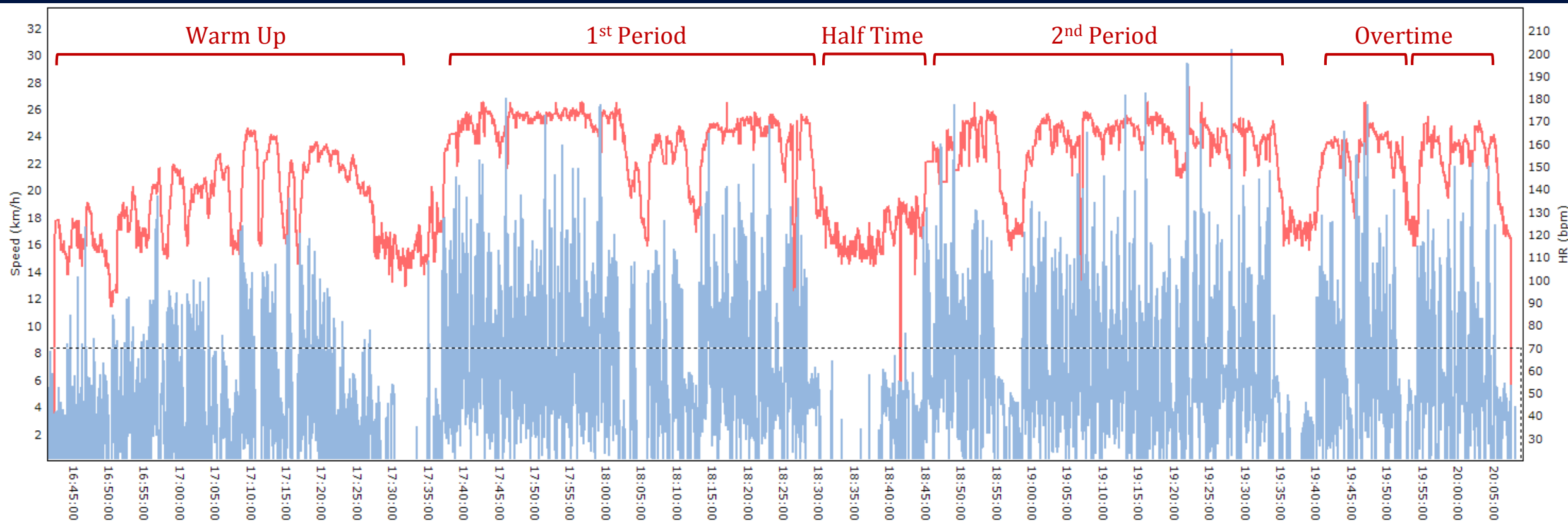


Training and Match Load

- *Fatigue*
- *Recovery*
- *Injury Prevention*
- *Rehabilitation*



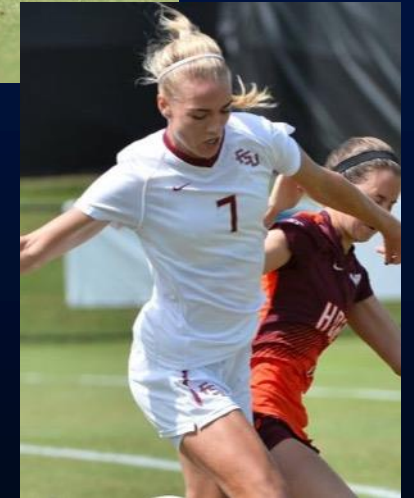
Virginia Tech vs Notre Dame



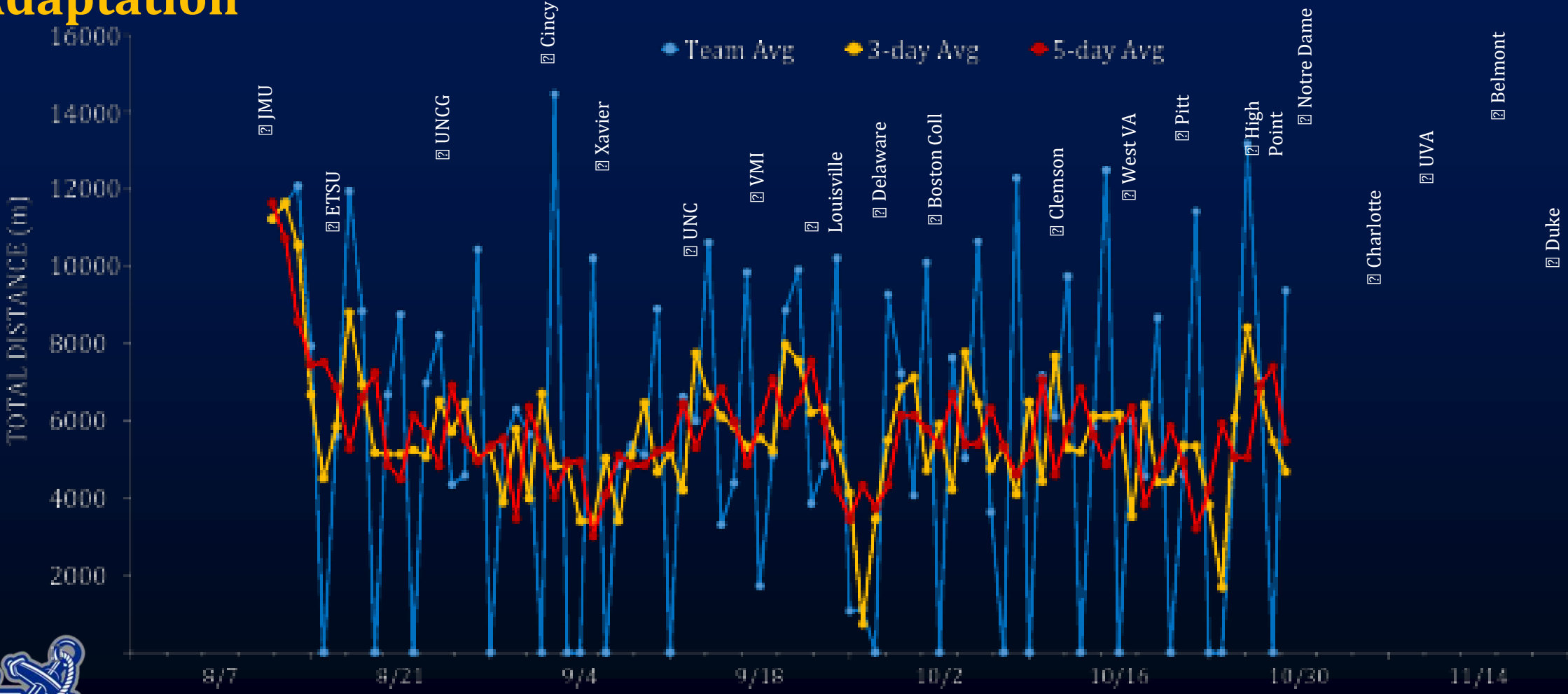
Match Performance and Recovery

Session = Warm Up + 90 min Match + 20 min Overtime

	<u>College Male</u>	<u>College Female</u>
Average Heart Rate:	162 bpm	164 bpm
Total Distance:	19,391 m (~12 mi)	15,996 m (~10 mi)
High Intensity Dist:	4,7058 m	3,282 m
Sprints:	93	73
Collisions:	12	10
Energy Expended:	1,905 kcal	1,220 kcal



Long-Term Recovery and Adaptation



Goals for Recovery

1. Recover for the next session (*day - short term*)
1. Recover for the next match (*week - intermediate term*)
1. Adapt to training (*months - long term*)



What Happens Post-Match?

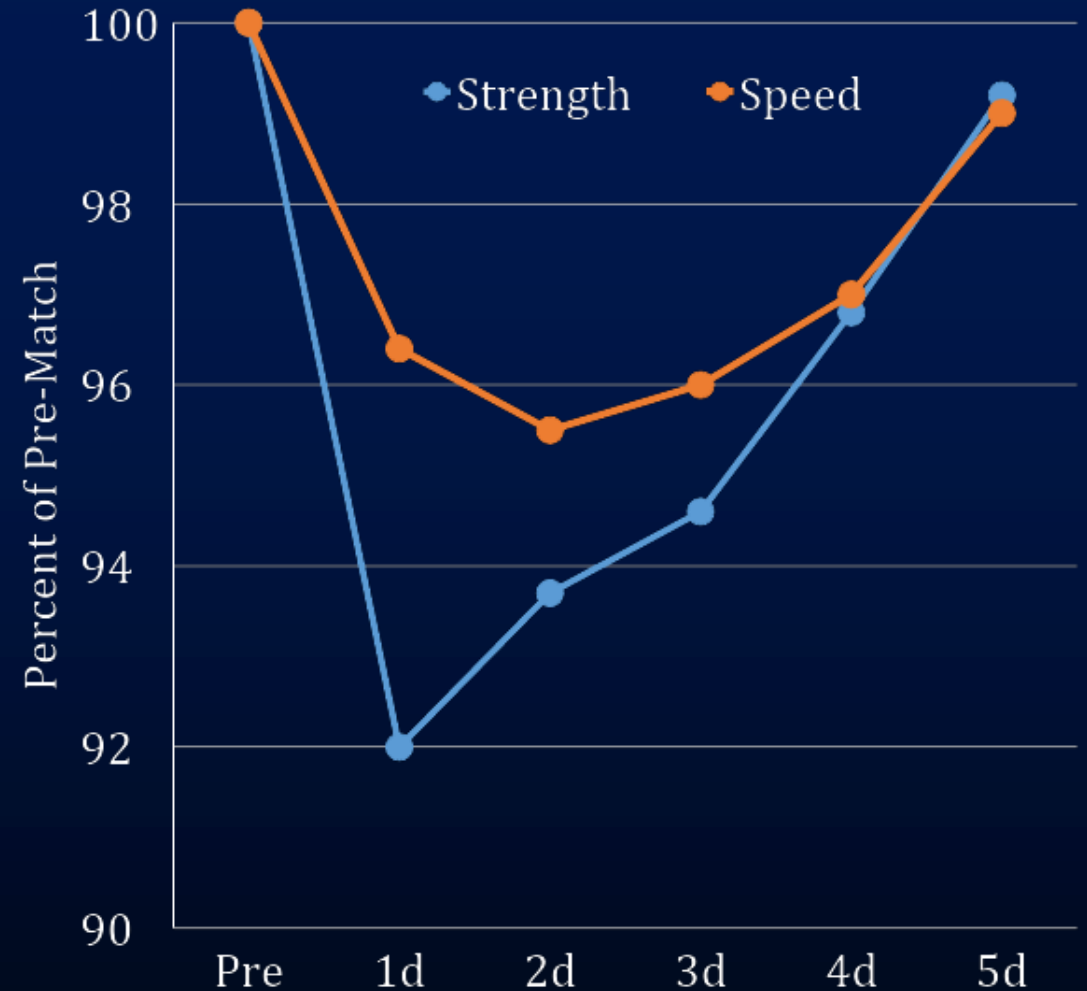
Energy and Fluid Stores

Glycogen Depletion and Dehydration

Rest – Sleep

Muscle Recovery

- Performance
- Soreness
- Adaptation



Where Can We Intervene?

Immediate – Term	0-30 min Post-Match
Short - Term	0-45 min Post-Match
Intermediate – Term	Several Hours Post-Match
Long - Term	Several Days Post-Match



Diet and Hydration

Recovery Diet and Hydration

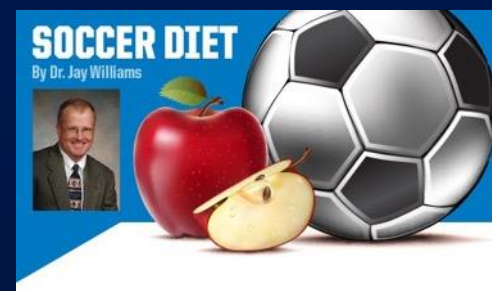
- *Carbohydrates and fluids*
- *Within first 45-60 min post-exercise*

Follow with a high carbohydrate meal

Solid, high carbohydrate, low fat diet



www.scienceofsocceronline.com



2014 NSCAA
Convention



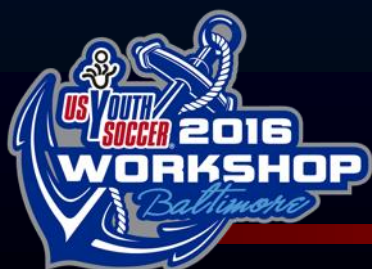
This week:

"Fueling Up for Match Day/Tournament"

Angel Planells, Nutrition Consultant, ACP Nutrition

"Nutritional Supplements to Enhance Soccer Performance: Debunking the Myths"

Dr. Ajit Korgaokar, Assistant Professor for Health & Human Performance, University of Tennessee-Martin

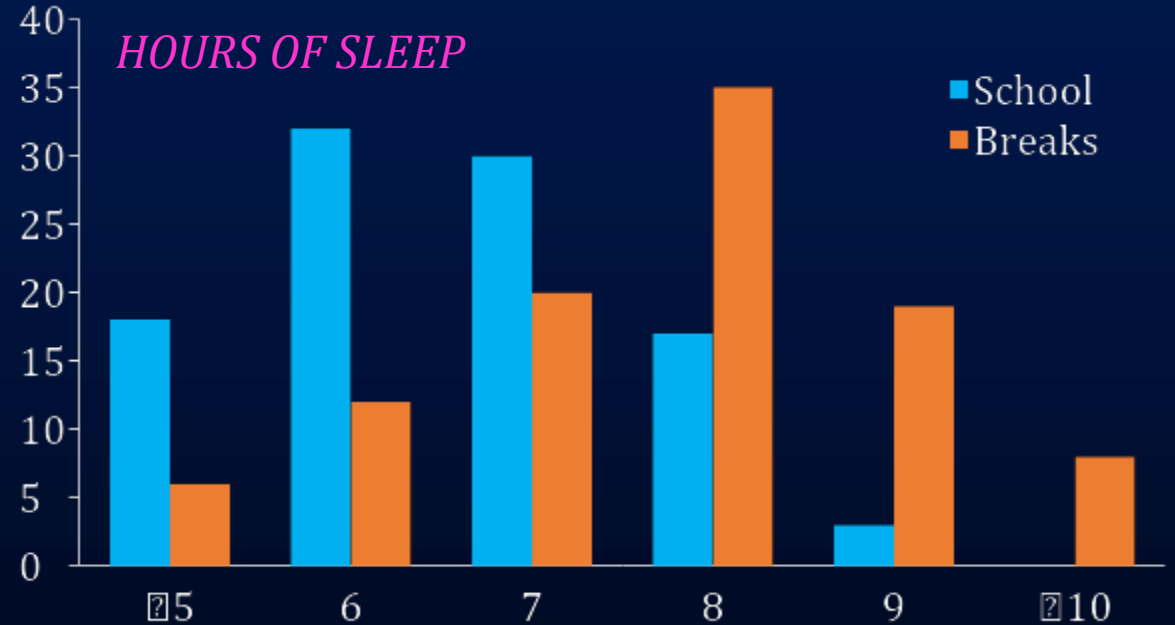
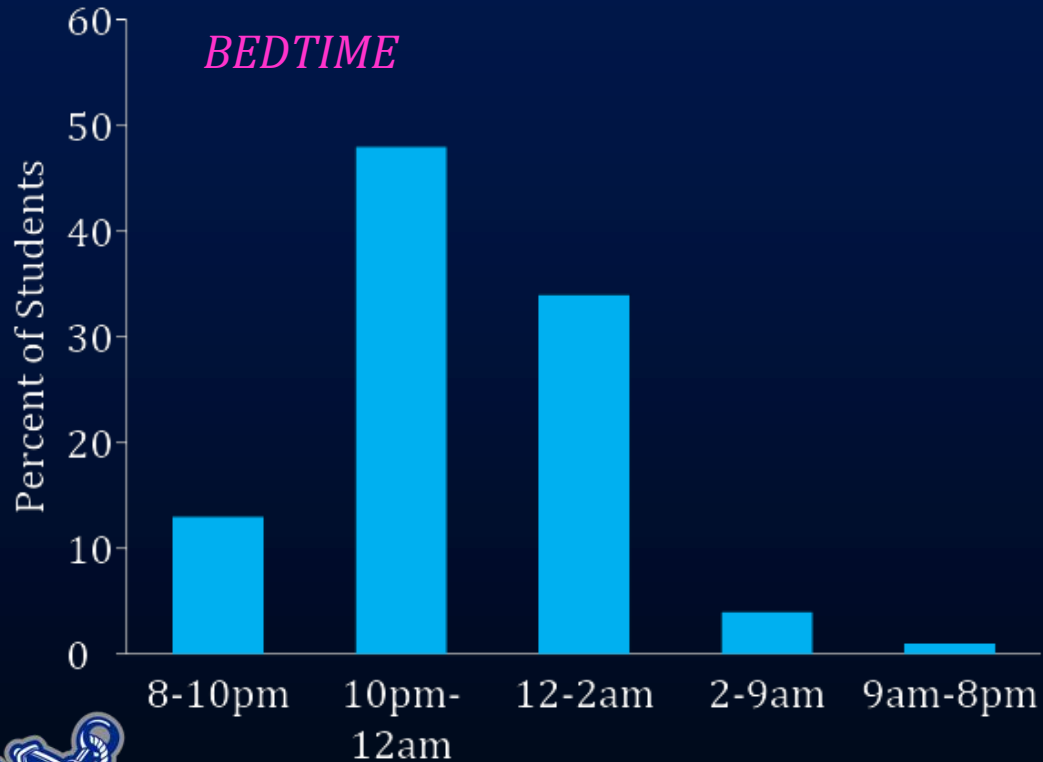


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Sleep

“Student-athletes say Sleep is the number one thing their athletic time commitments prevent them from doing, ultimately hindering their athletic and academic performance”

PAC 12 Survey, 2015



Sleep - Consequences

Athletes generally do not get enough sleep

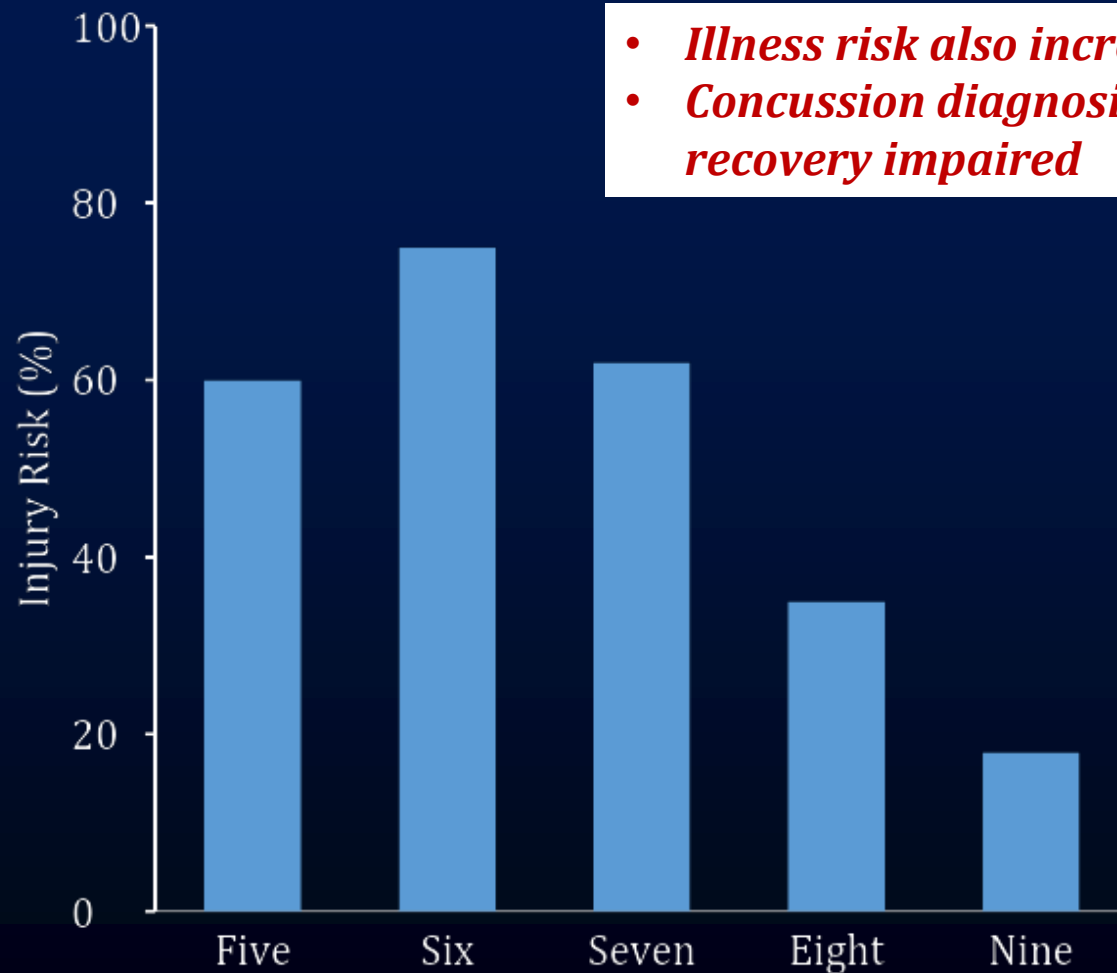
- College and high school

Can impact physical and mental performance

- Cognitive, decision making
- Reaction time
- Strength
- Power
- Endurance



Sleep – Injury Risk in Young Athletes



- *Illness risk also increased*
- *Concussion diagnosis and recovery impaired*



What is “Delayed Onset Muscle Soreness?”

- **Definition**

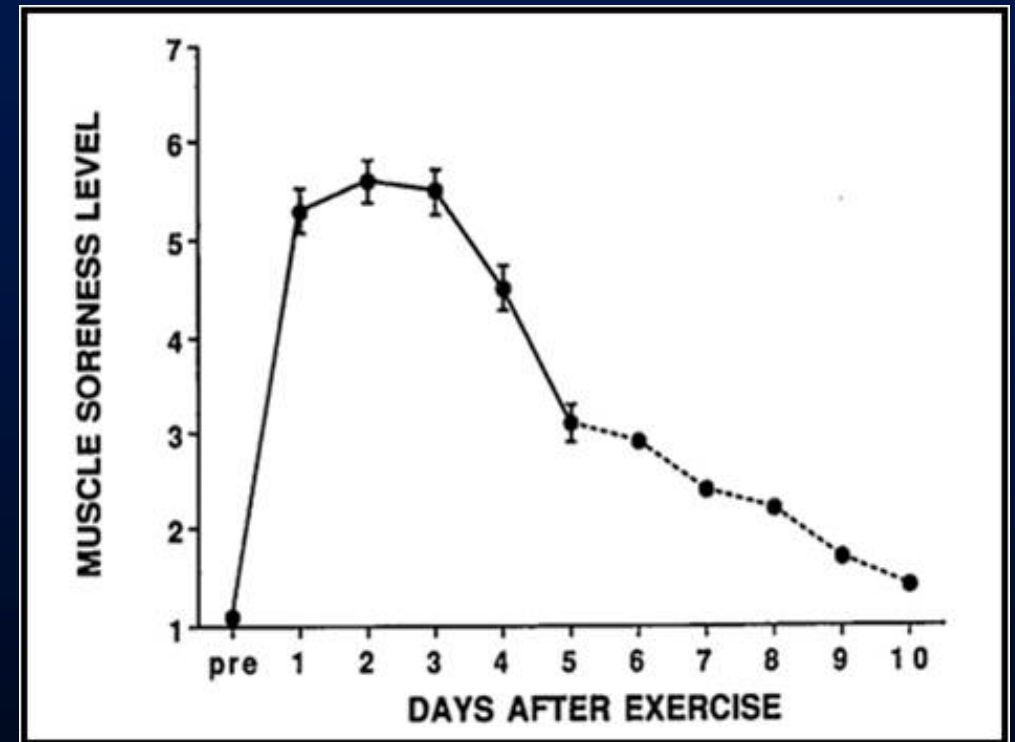
- Occurs following “**novel**” exercise
 - Single or repeated contractions
- Often eccentric exercise
 - Greater force, more novel

- **Time Course**

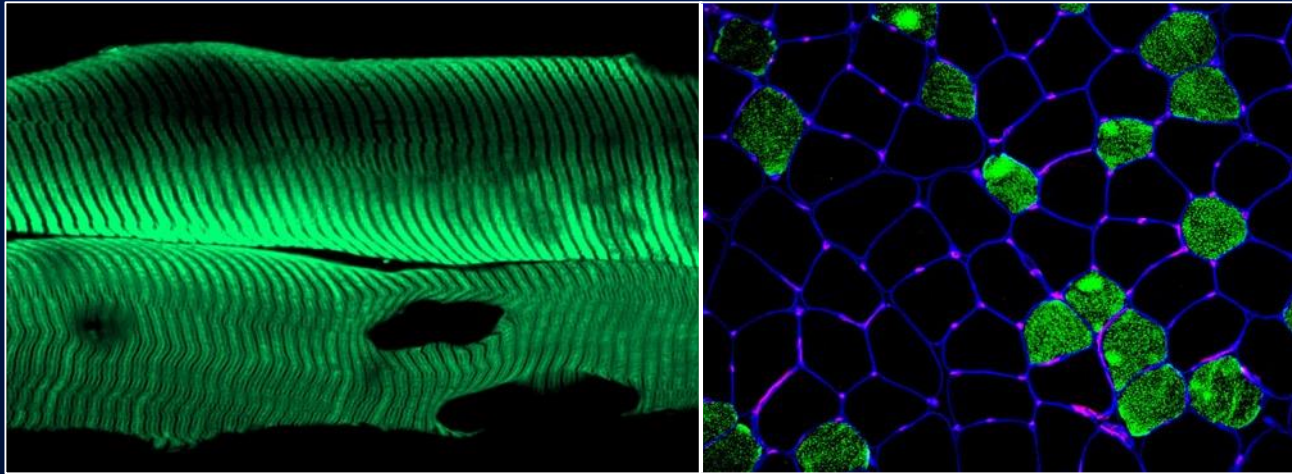
- Appears within 24 hrs of exercise
- Peaks between 24-72 hrs post-exercise
- Disappears within 72 hrs

- **Not Due To:**

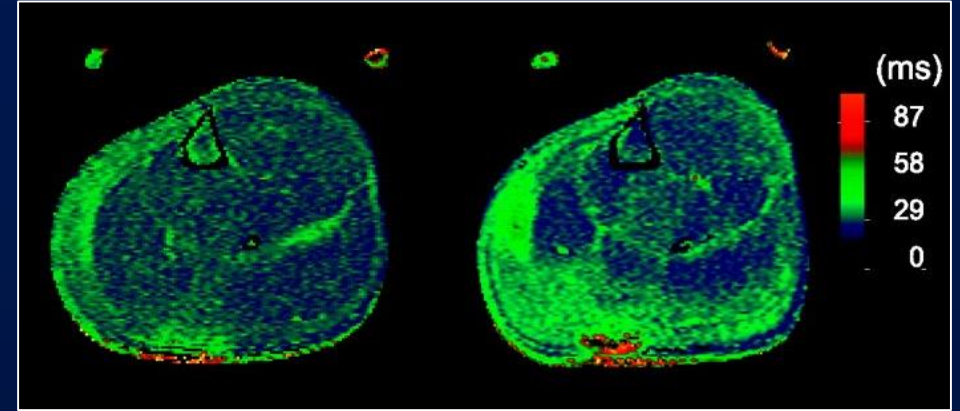
- Strain, tear, cramps or chronic pain
- A pathological / disease condition



What Causes Muscle Soreness?

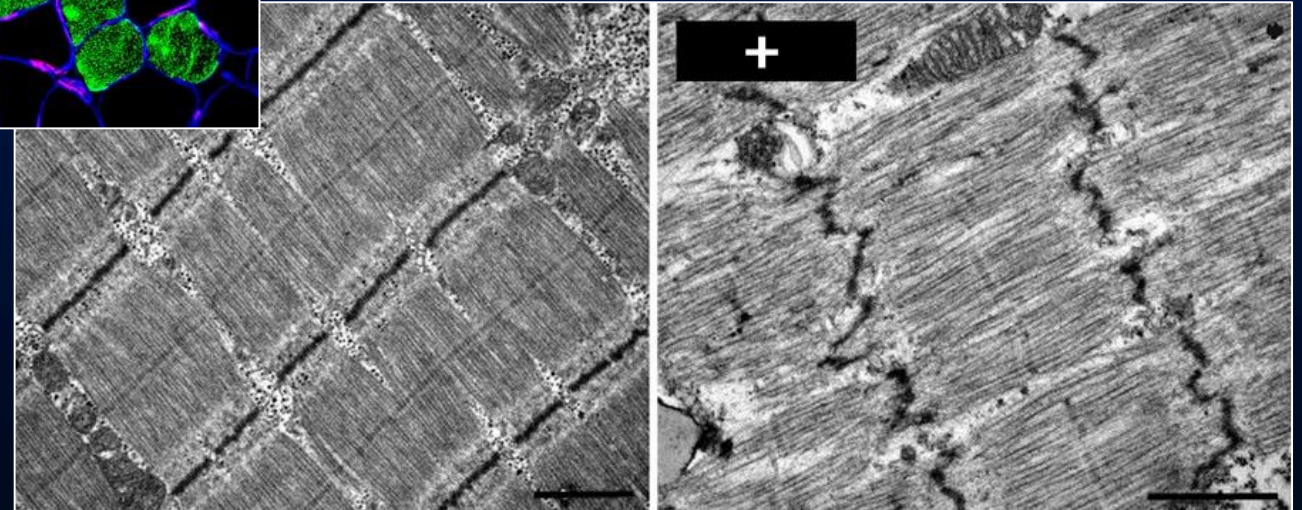


Muscle Fiber



Muscle Fiber Damage

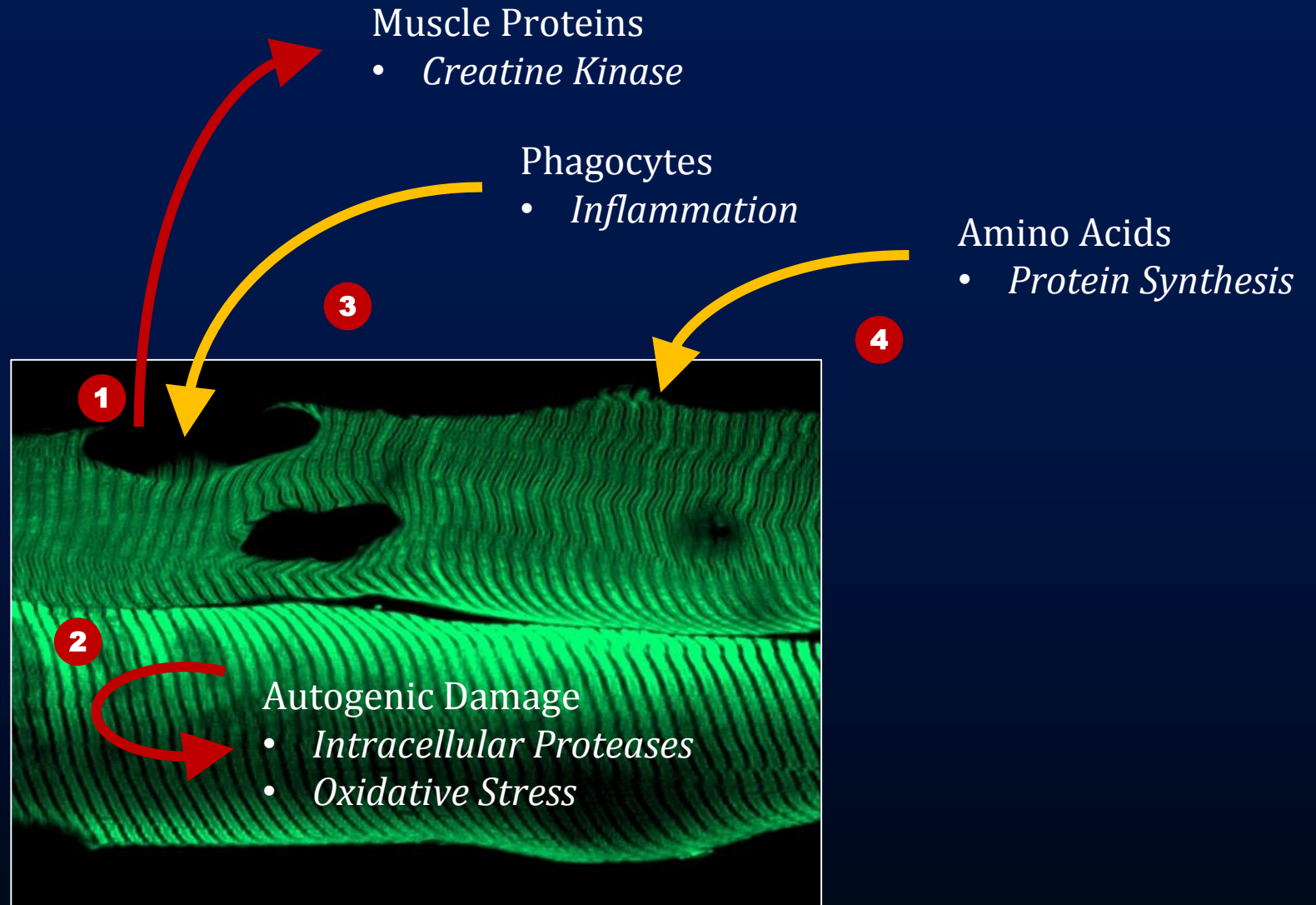
- *Not metabolic (lactic acid)*
- *Not temperature*



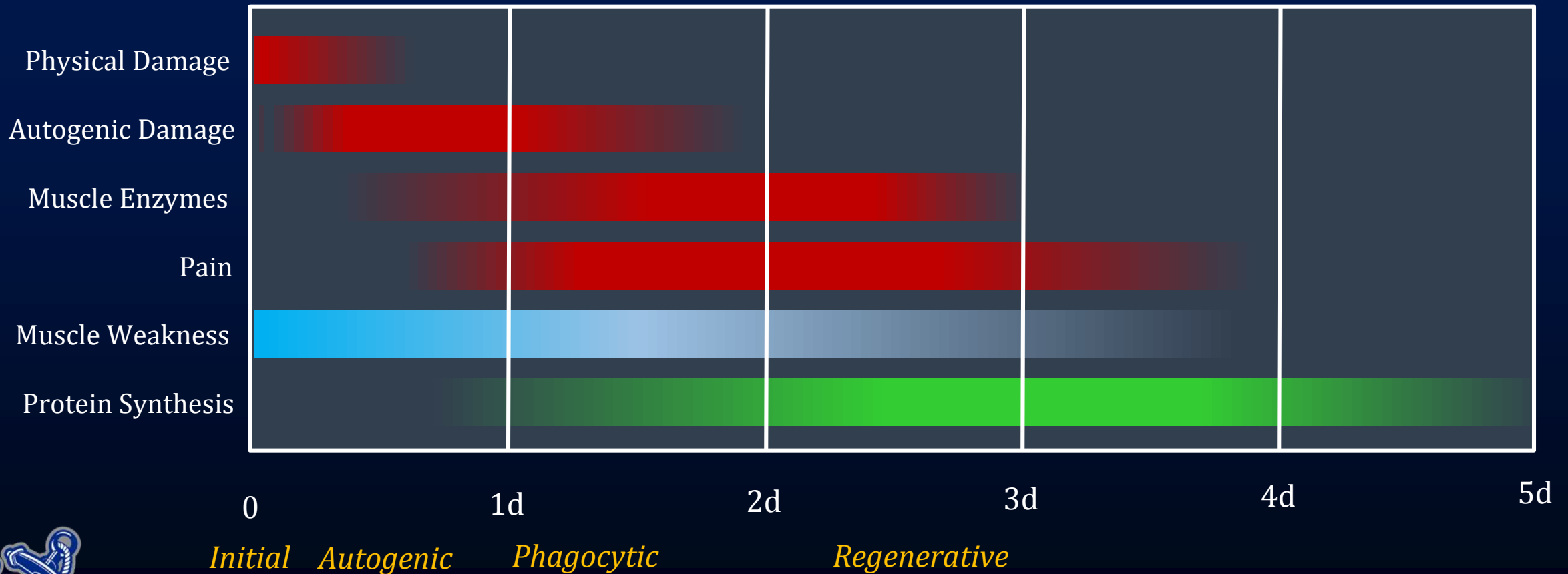
Muscle Proteins

Effects of Damage

- 1 Physical Damage
- 2 Autogenic Damage
(Oxidative Stress, Calcium)
- 3 Pain / Inflammation
- 4 Repair



Muscle Damage and Repair



How Best to Deal with Muscle Soreness?

- **Physical**
 - *Cool Down*
 - *Massage and Compression*
 - *Ice and Cryotherapy*
- **Nutrition / Supplements**
 - *Antioxidants*
 - *Medications*
- **Training**

Physical Damage

Autogenic Damage

Pain / Inflammation

Repair



Physical Strategies – COOL DOWN

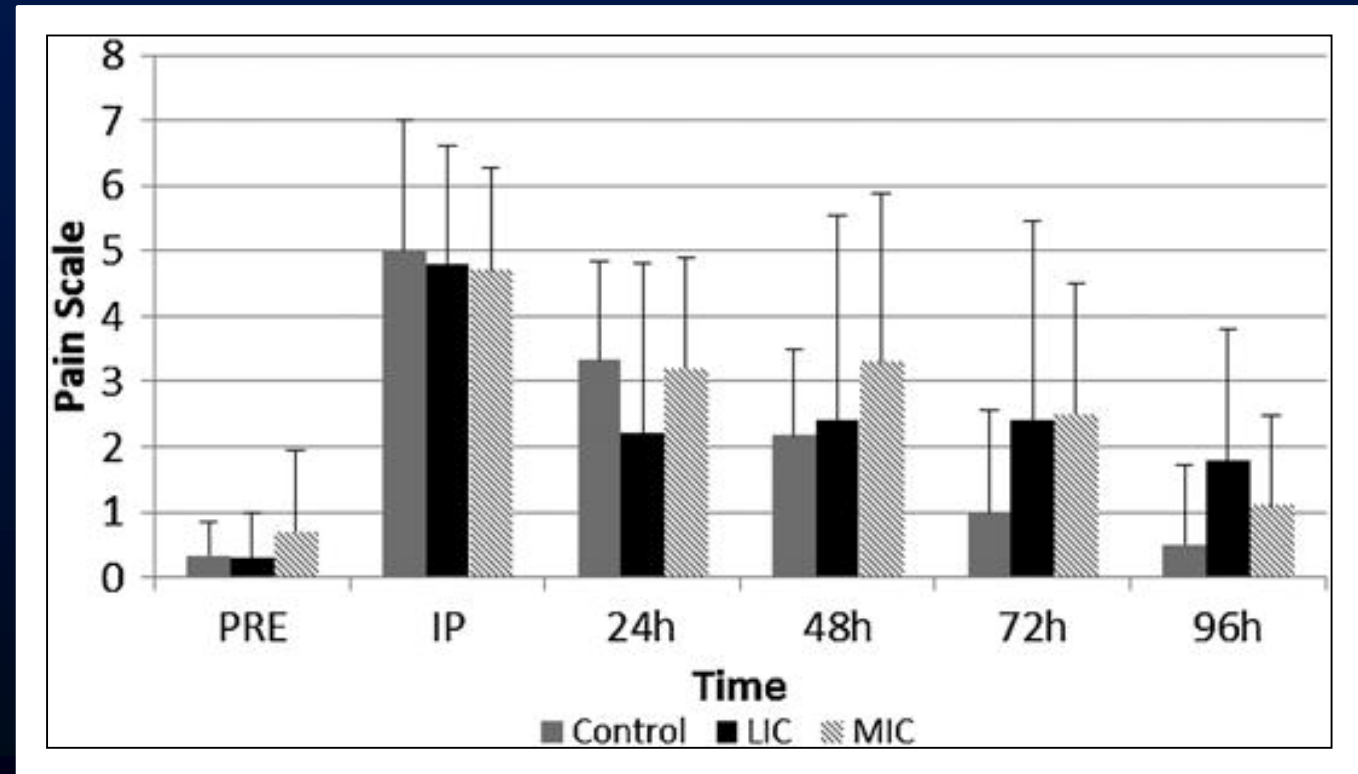
Muscle Strength and Soreness

Confusing effects

- Limited research data
- Small benefit
- No benefit

No adverse effects

Psychological benefits (??)



Physical Strategies – MASSAGE

Theory:

- Passively increase blood flow
- Alleviate pain, aid recovery



Practice:

- Some benefits but are highly variable, *often temporary*
- Large psychological effect
 - Relaxation
 - Meditation

Physical Damage

Autogenic Damage

X *Pain / Inflammation*

Repair



Physical Strategies – COMPRESSION



Theory:

- Reduces blood pooling
- Limits autogenic damage

Physical Damage

X Autogenic Damage

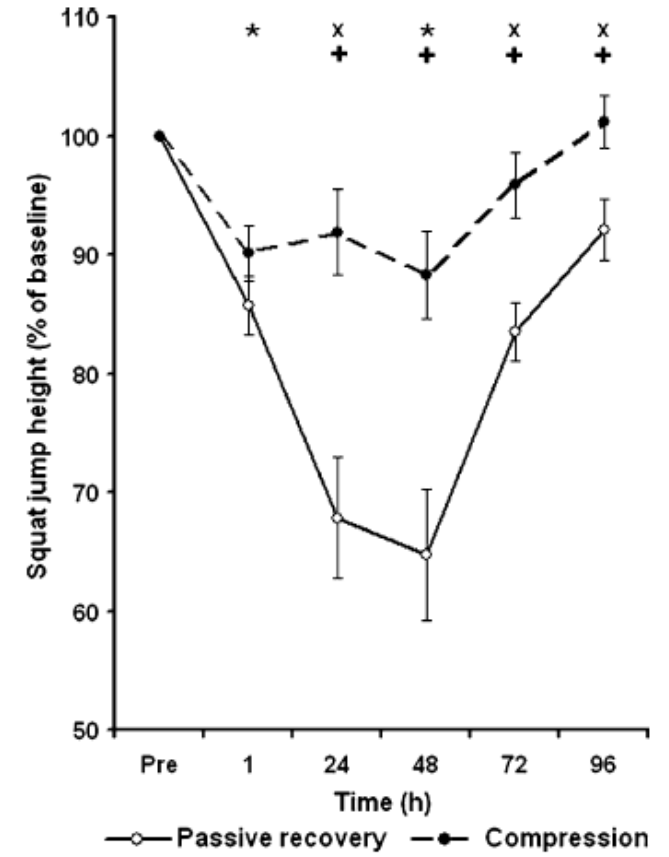
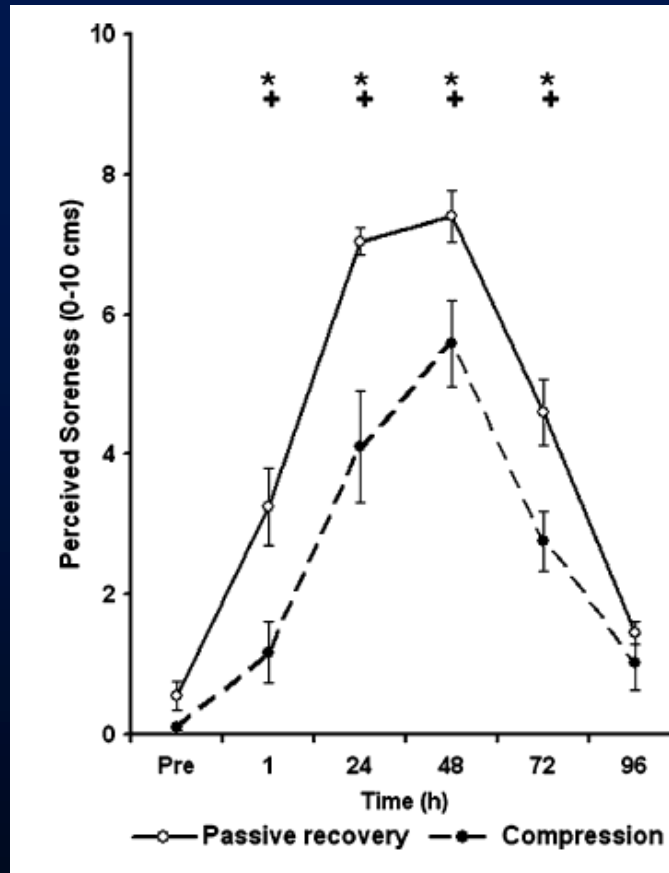
X Pain / Inflammation

Repair

Physical Strategies – COMPRESSION

Practice:

- Some benefits, but are highly variable
- Limit pain and damage
- Largest effect with inactive, long-term recovery
 - *Bus / car ride home*



Jakeman et al., 2010



Physical Strategies - ICE

Ice and Cryotherapy

Theory:

- Reduce inflammation and swelling
- Arrest autogenic damage (protein breakdown)



Physical Damage

X Autogenic Damage

X Pain / Inflammation

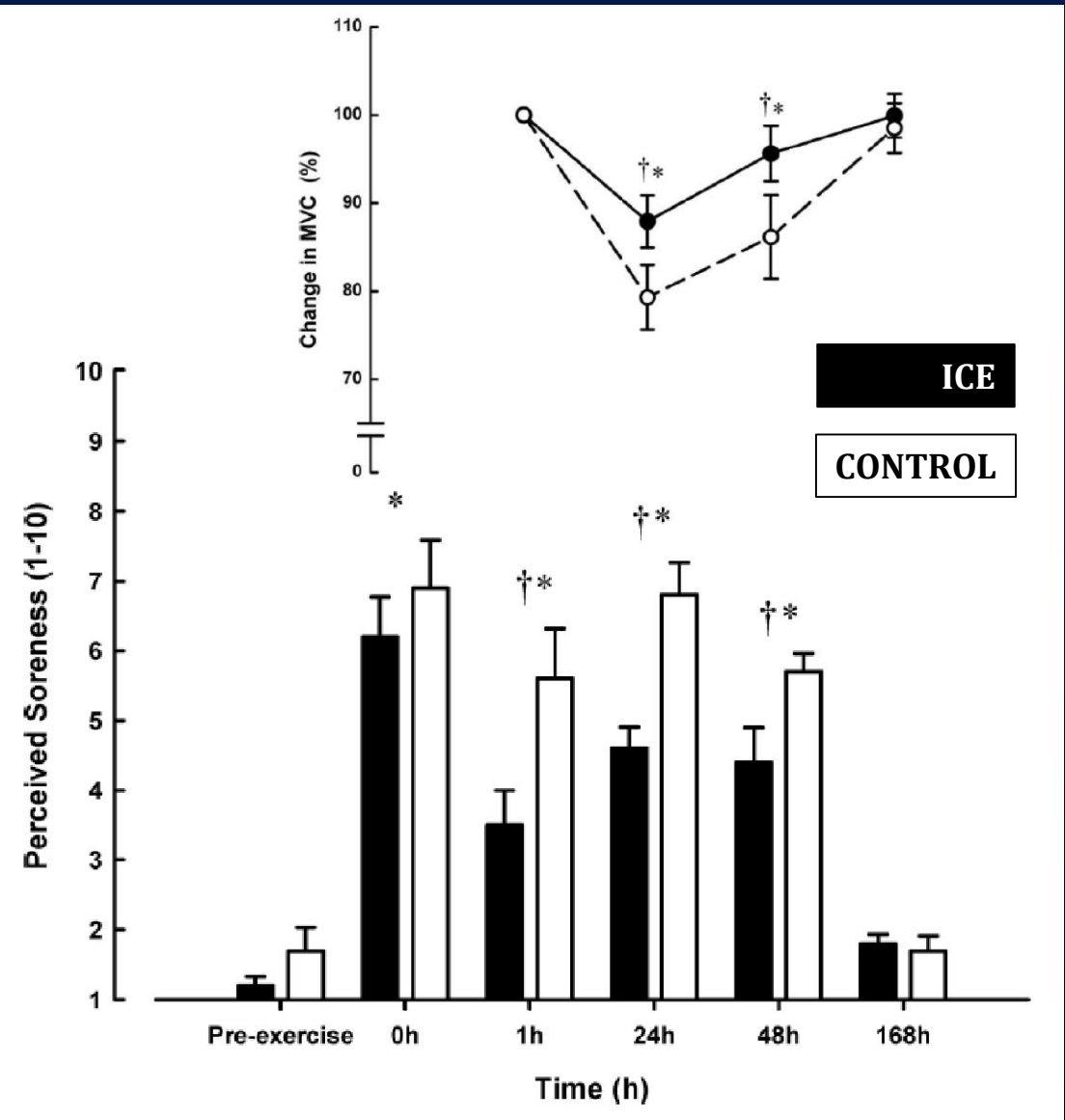
Repair



Physical Strategies - ICE

Practice:

- Perhaps a minor effect
- May be psychological
- Adverse effects ??? (more later)



Bailey et al, 2007



Nutritional and Supplement Strategies

Must consider the cycle of soreness and long-term adaptation



Physical Damage

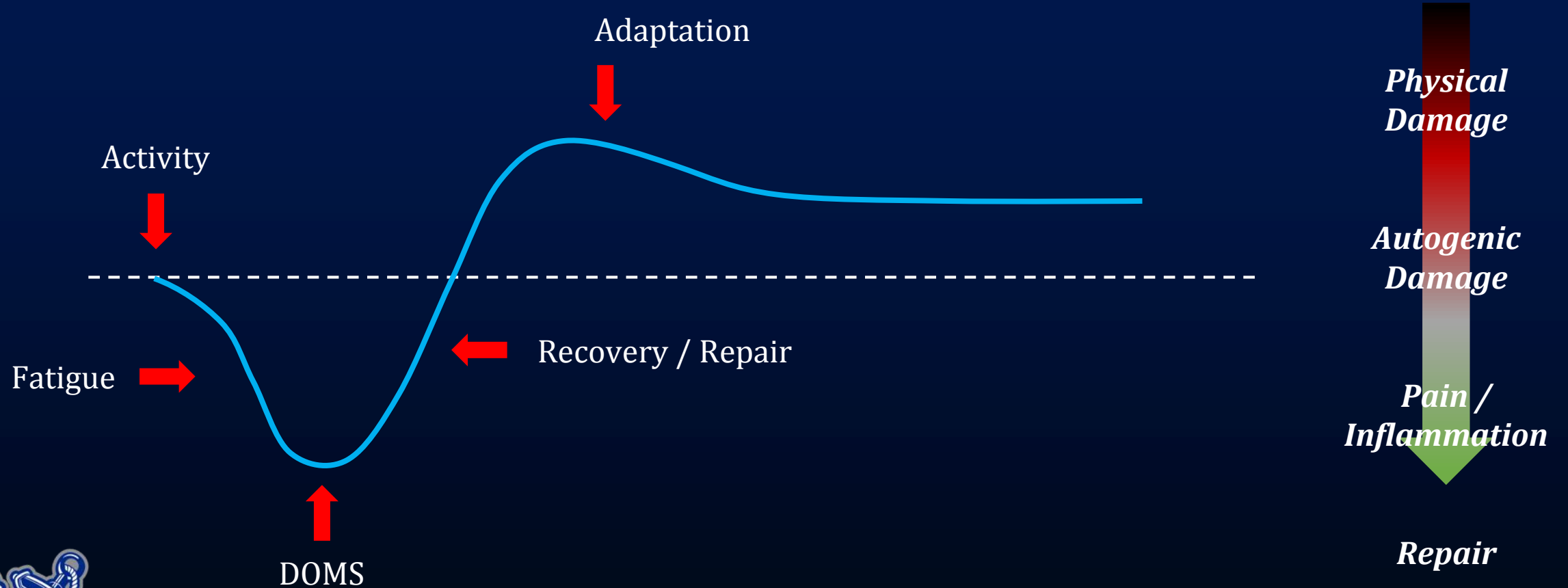
Autogenic Damage

Pain / Inflammation

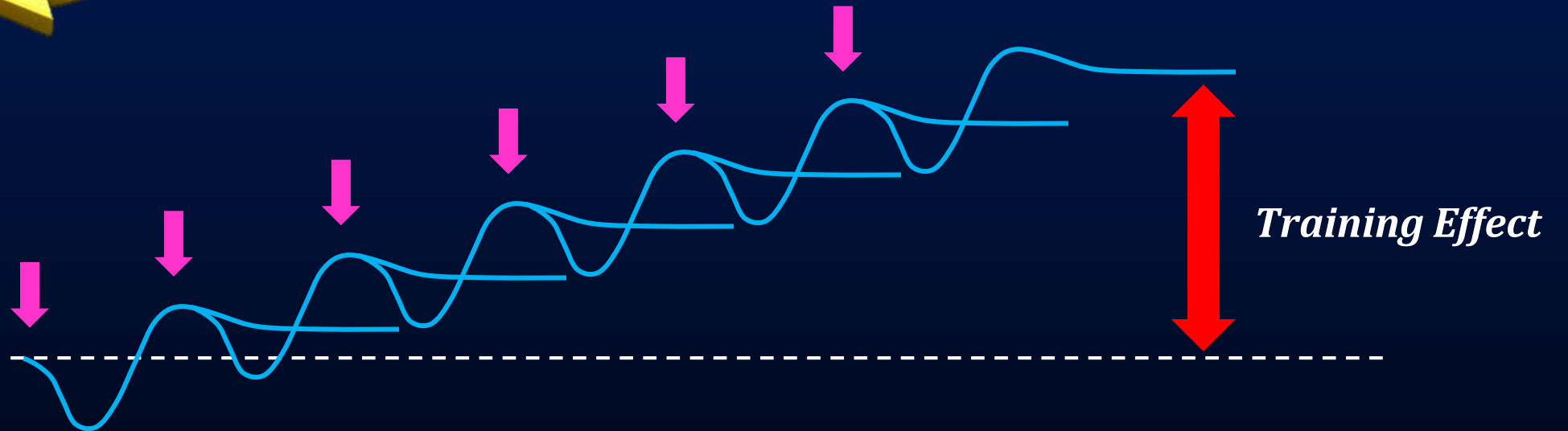
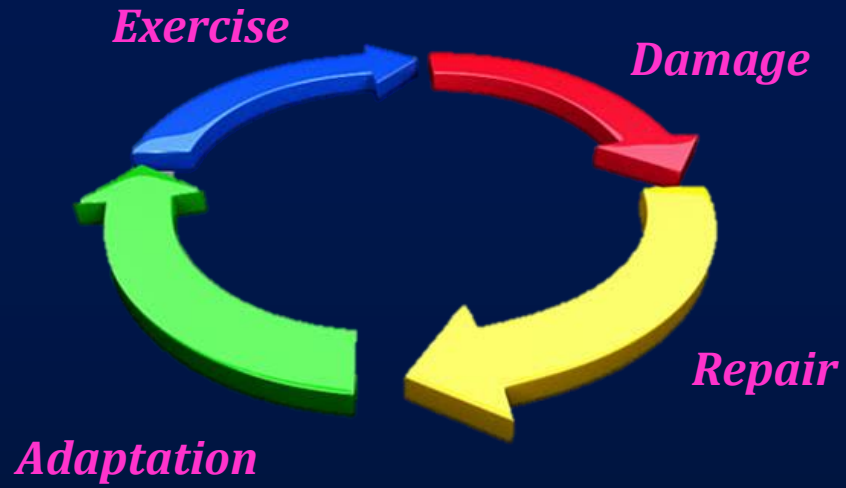
Repair



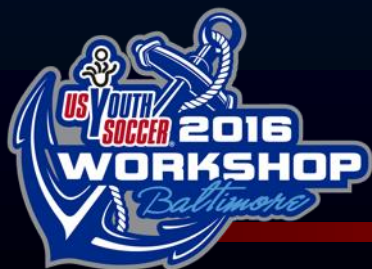
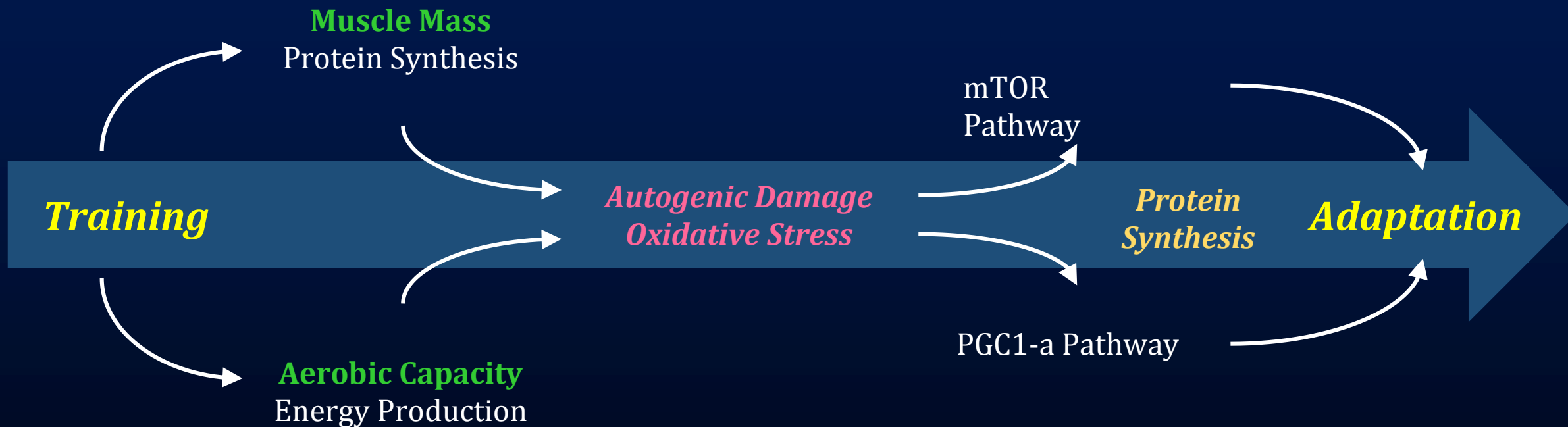
Long-Term Recovery and Adaptation



Long-Term Recovery and Adaptation



Does Muscle Have to Be Torn Down to Be Built Up?



Supplements – ANTIOXIDANTS

Theory

- Reduce oxidative stress during exercise
- Limit autogenic damage
- Alleviate pain



Physical Damage

X Autogenic Damage

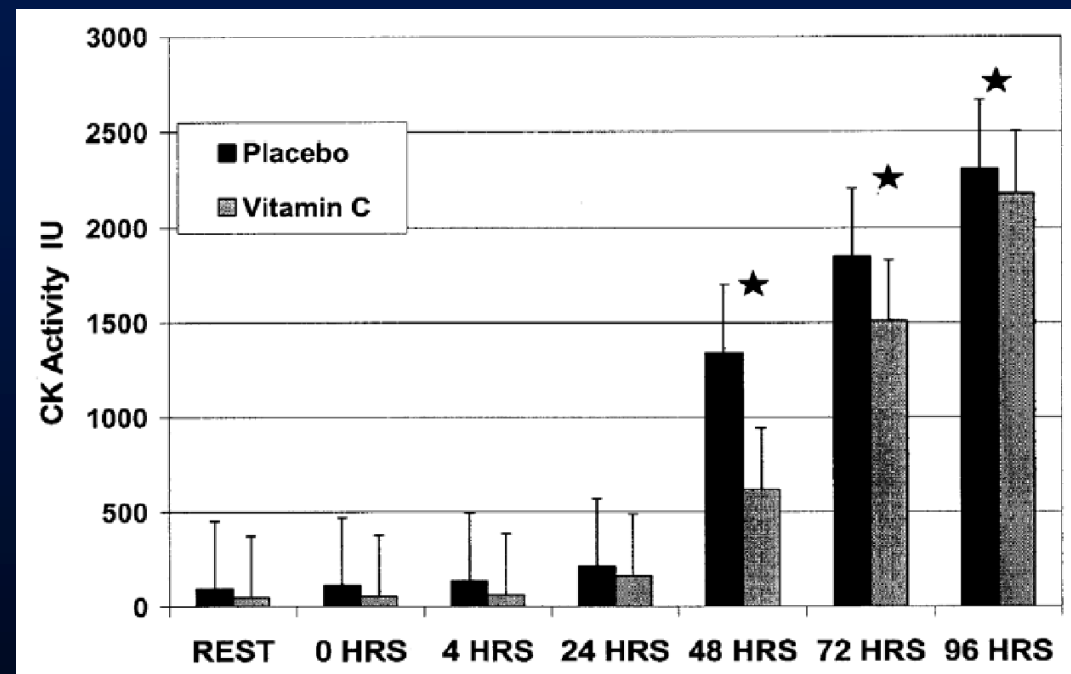
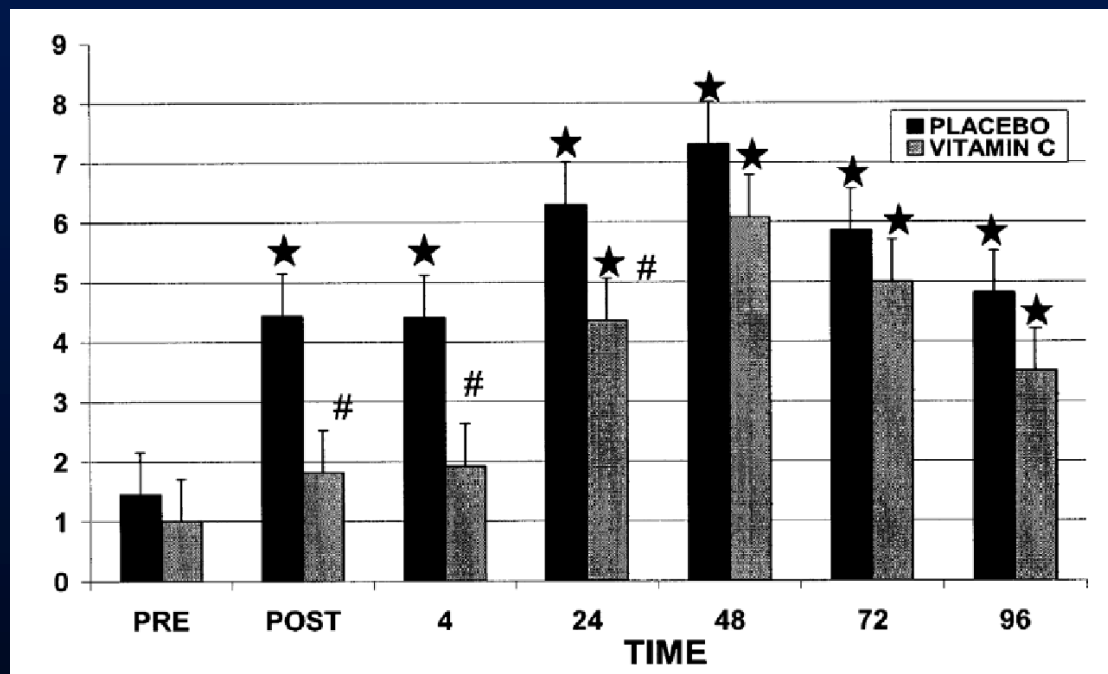
X Pain / Inflammation

Repair



Supplements – ANTIOXIDANTS

Short-Term

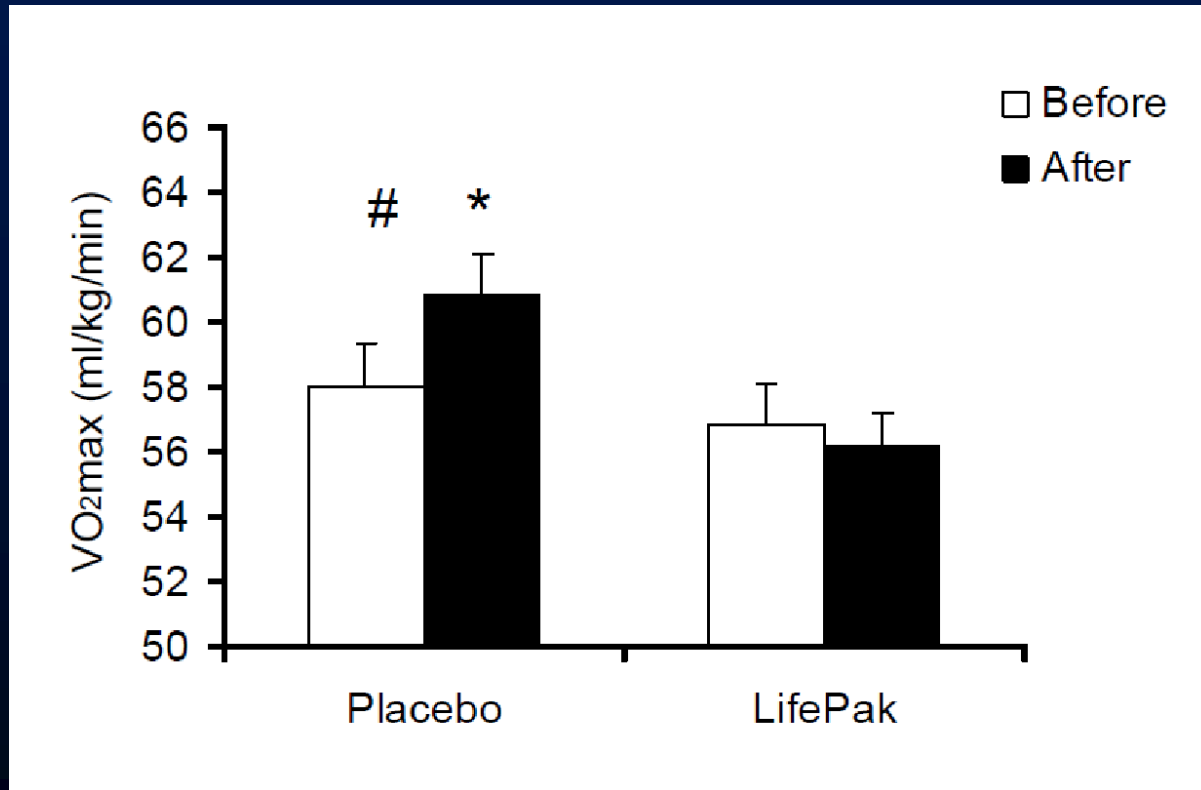


Bryer and Goldfarb, 2006



Supplements – ANTIOXIDANTS

Long-Term



Physical Damage

X Autogenic Damage

X Pain / Inflammation

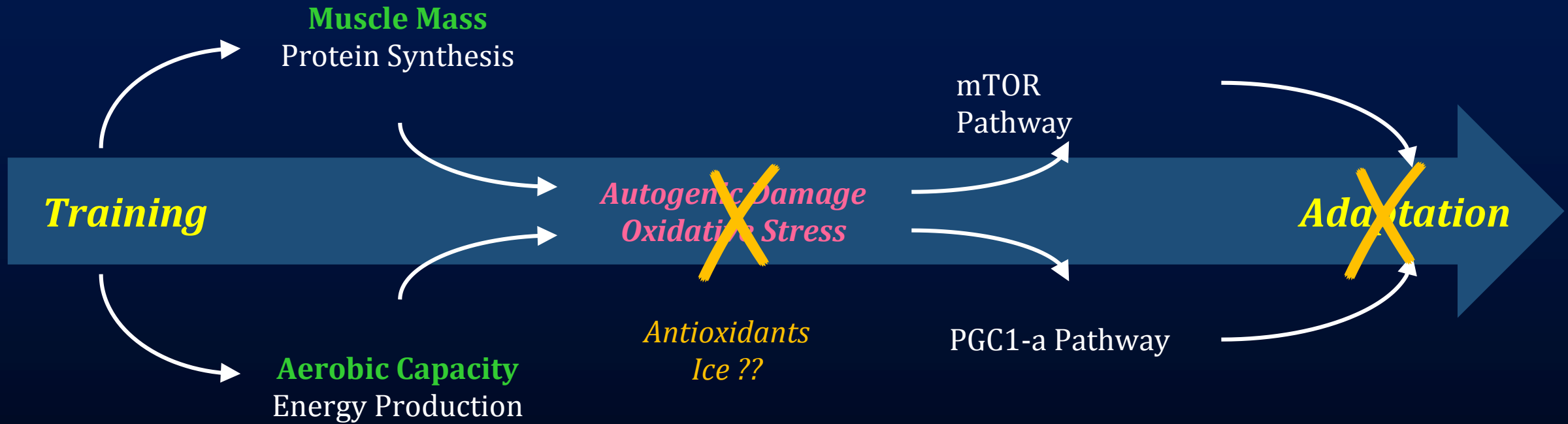
X Repair



Skaug et al., 2014

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Does Muscle Have to Be Torn Down to Be Built Up?

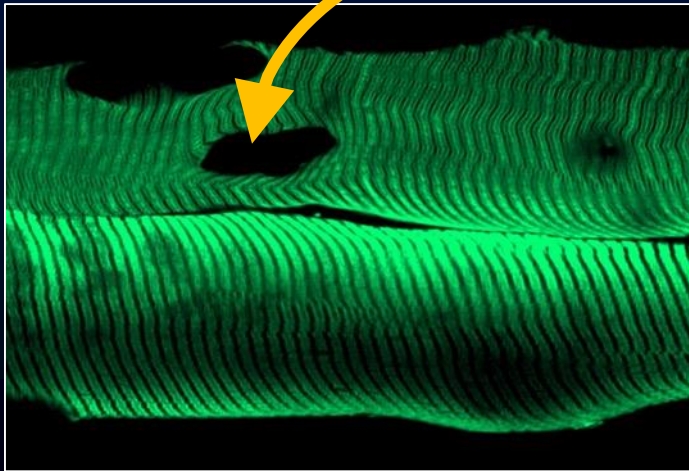


Supplements – BCAAs / PROTEINS

Theory

- Promote a positive protein balance
- Provide “building blocks” for protein synthesis
- Enhance recovery and repair
- Improves glycogen synthesis – energy replenishment

Amino Acids



Physical Damage

Autogenic Damage

X *Pain / Inflammation*

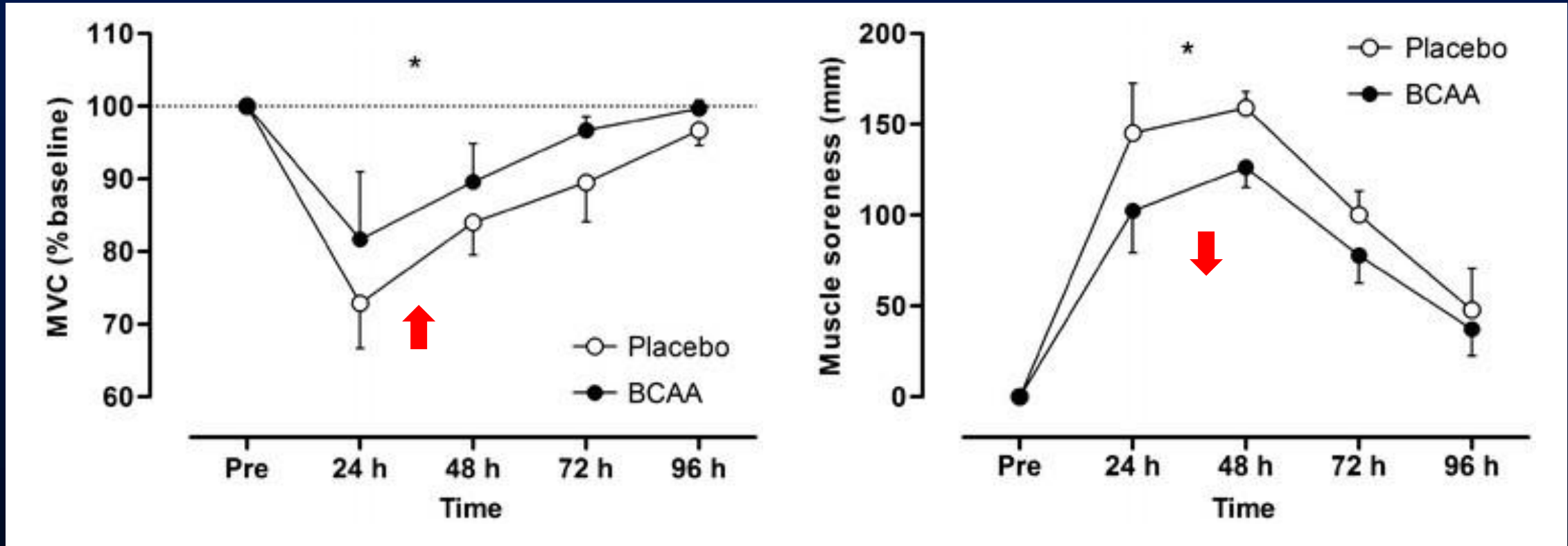


Repair



Supplements – BCAAs / PROTEINS

BCAAs supplemented after exercise



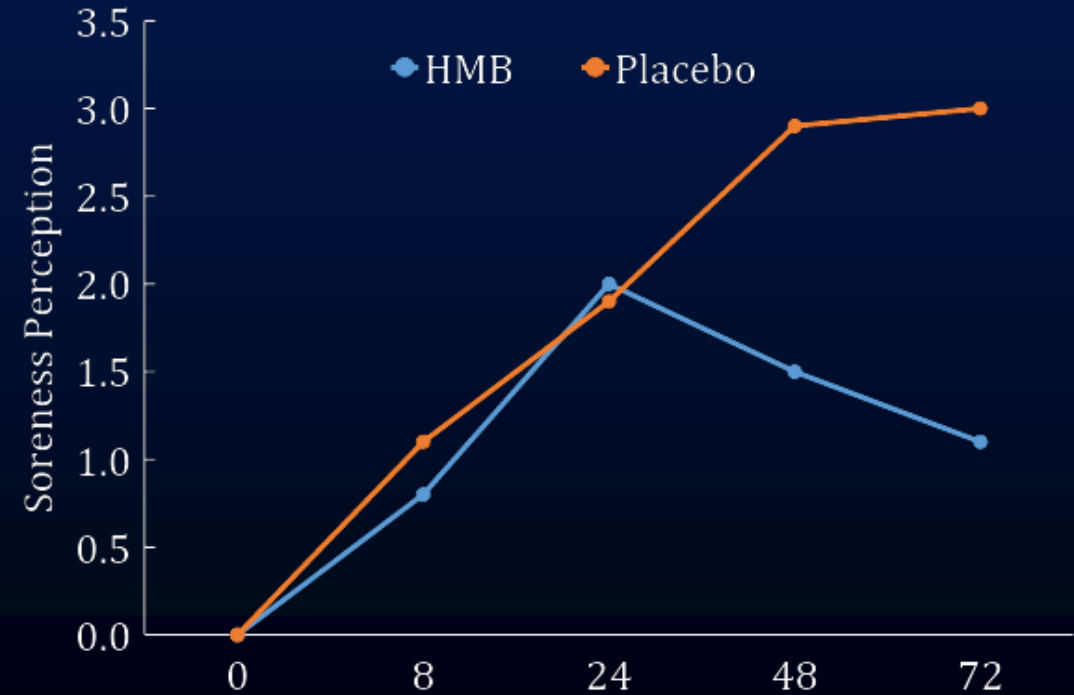
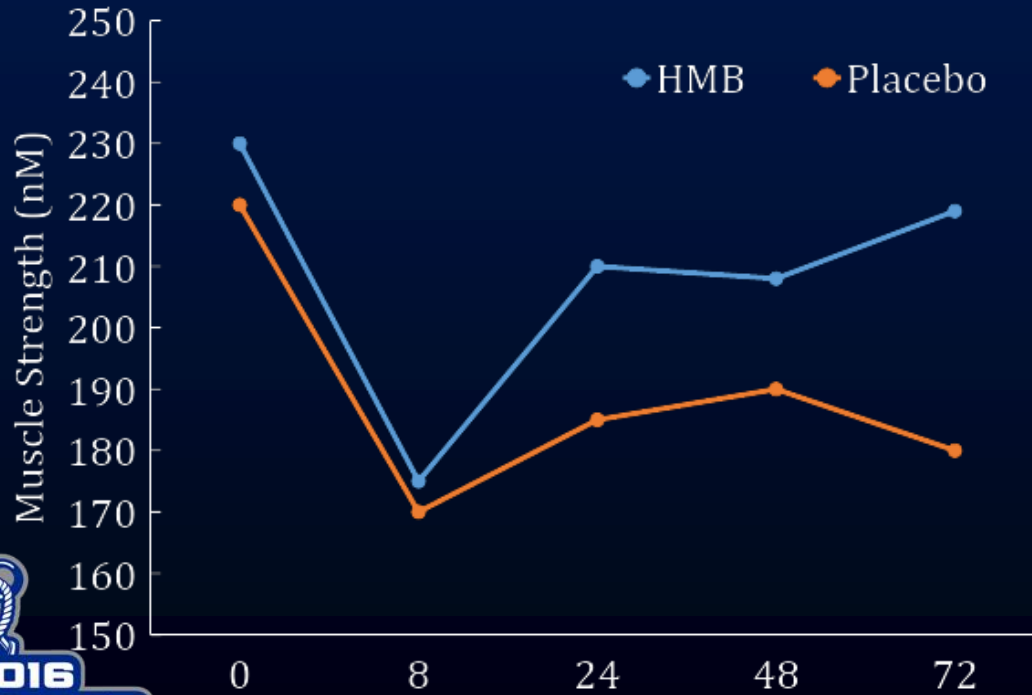
Howatson et al., 2012

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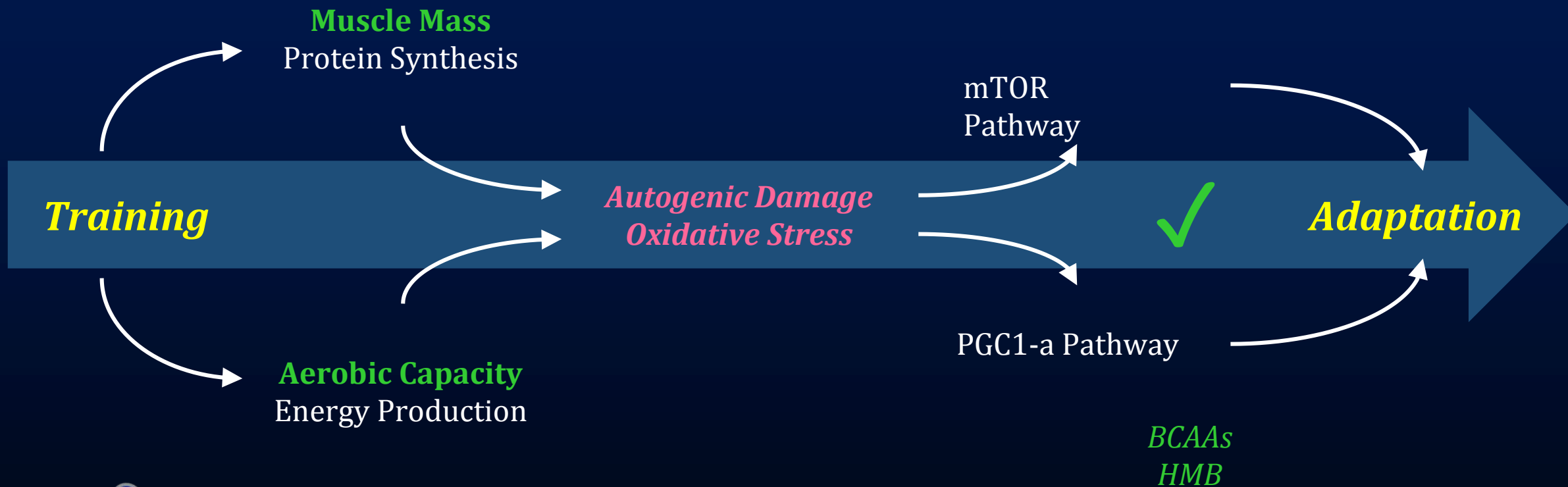
Supplements – HMB

Practice:

- Blunts protein & membrane breakdown
- Reduces soreness
- Enhances protein synthesis



Does Muscle Have to Be Torn Down to Be Built Up?



Training

Making the Activity *“Less Novel”*



X *Physical Damage*

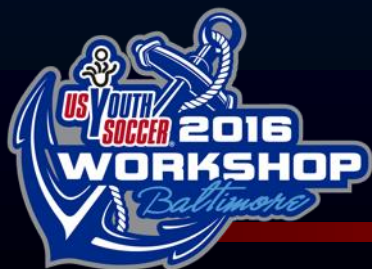
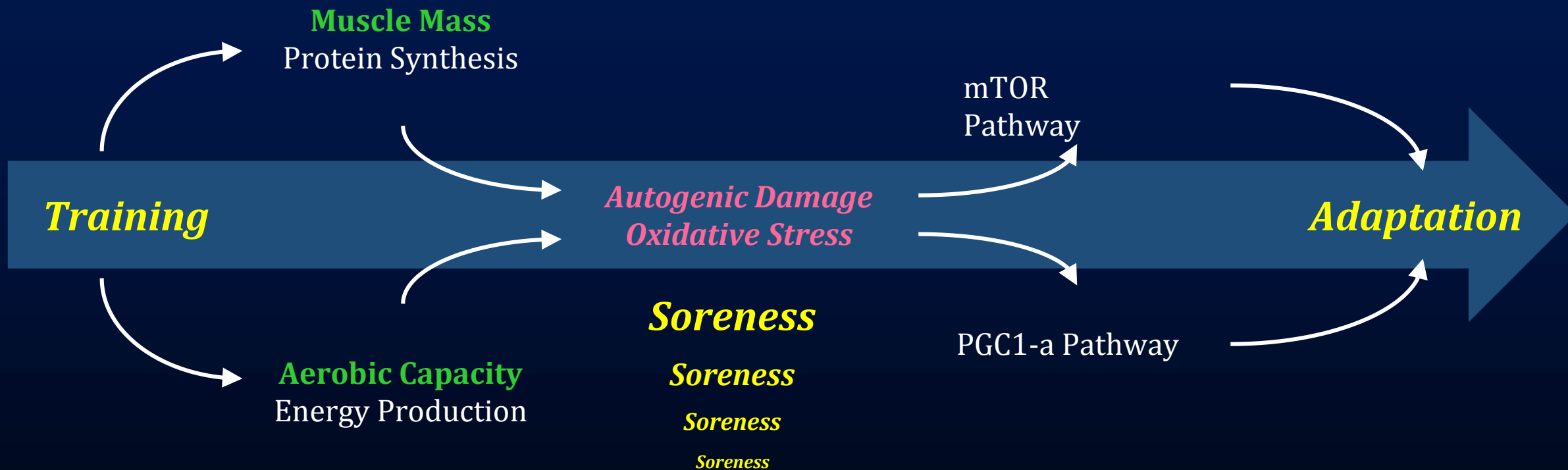
Autogenic Damage

Pain / Inflammation

✓ *Repair*



Does Muscle Have to Be Torn Down to Be Built Up?



Recovery Strategies – What Works?

Immediate Term (<15 min)

- ✓ Cool Down
- ✓ Stretching

Short Term (15 – 120 min)

- ✓ Nutrition and Hydration
- ✓ Cryotherapy– Cold Water Immersion

Intermediate Term (2-6 hrs)

- ✓ Compression
- ✓ Massage
- ✓ BCAA / HMB

Long Term (4-48 hrs)

- ✓ Training
- ✓ Sleep
- ✓ BCAA / HMB



For More Info...

[www.scienceofsocceronline](http://www.scienceofsocceronline.com)

- FaceBook
- Twitter

[Science Behind Soccer Nutrition](#)

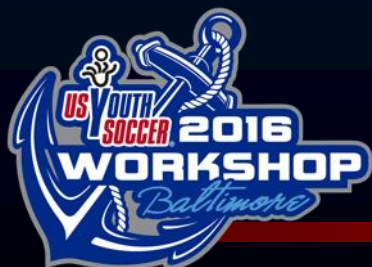
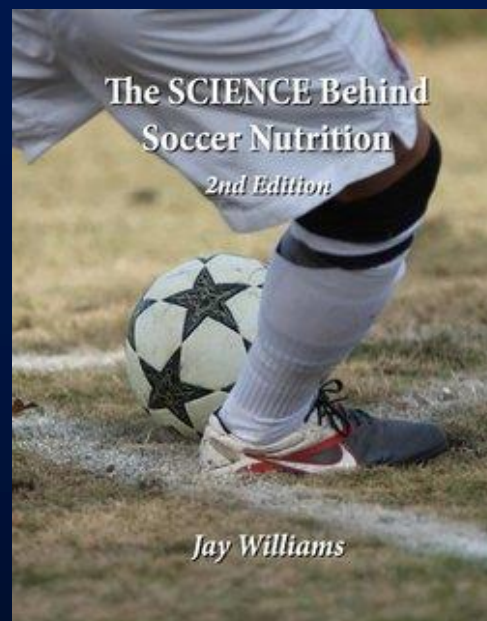
- Amazon

[US Youth Soccer & NSCAA Websites](#)

- Nutrition articles
- This presentation

The Science of
Soccer Online

"Where cutting-edge research meets the pitch"



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