Cannabis and Health

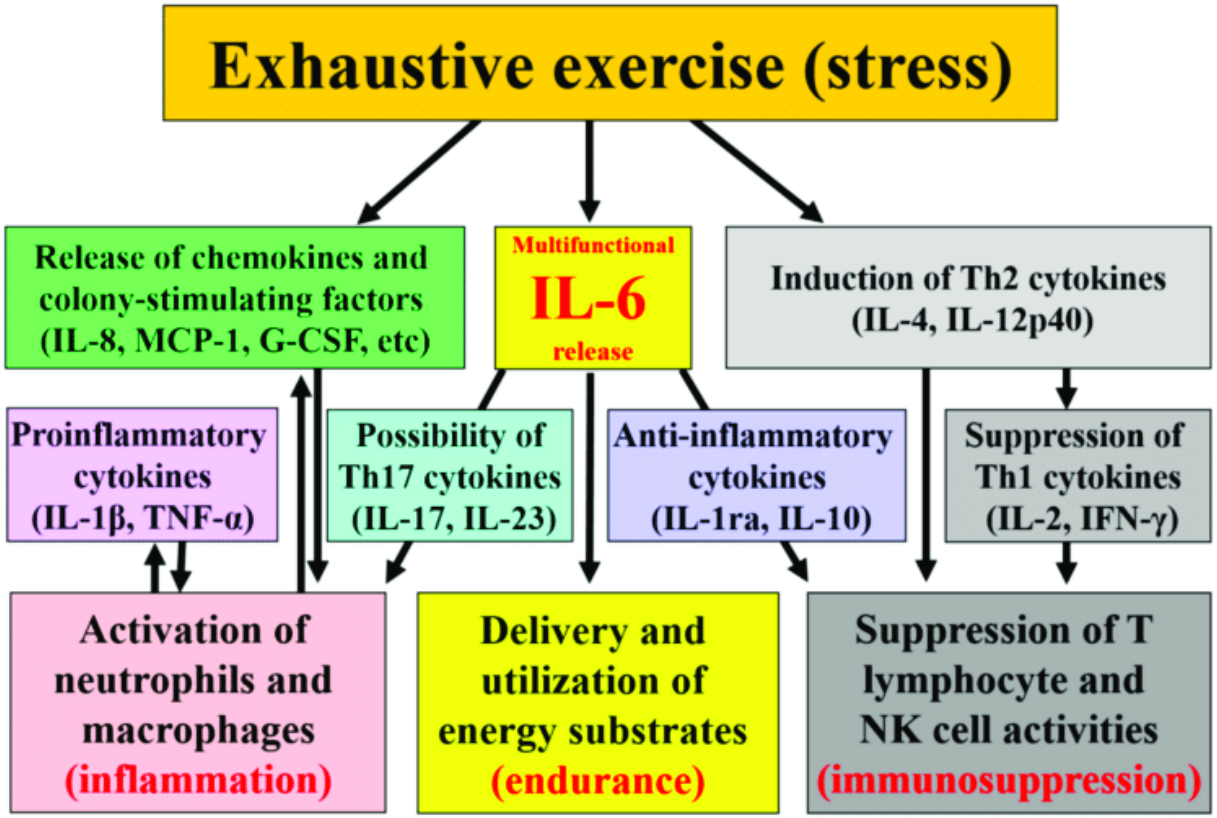
Module 14: Sports, Exercise, and Recovery

Lecture 3: Effect of Cannabinoids on Recovery

Main Benefit may be RECOVERY

- Cannabis has well-known anti-inflammatory effects
- Cannabis has been shown to relieve pain
- Being physically active, particularly when starting something new, pushing yourself to the next level in an activity, or engaging in high level competition can be PAINFUL
- Cannabis may aid in recovery due to pain relief and anti-inflammation
  - Better recovery means getting “back out there” sooner
  - Better recovery means being able to maintain consistent exercise for better health

Exercise and Inflammation



Suzuki, K. (2018). Cytokine Response to Exercise and Its Modulation.

- Muscle-derived IL-6 is the cytokine that responds most robustly to acute exercise
- Induces the release of IL-1ra, a potent anti-inflammatory cytokine, and suppresses TNFa, a pro-inflammatory cytokine
- Anti-inflammatory action of IL-1ra suppresses pro-inflammatory cytokines associated with cardiovascular disease and type II diabetes

Exercise and Inflammation

- There are many health benefits of exercise that result from it's anti-inflammatory effects over the long term
- However, ACUTELY, exercise is an inflammatory process that causes
  - damage to muscle tissue
  - pain
  - soreness
- The acute inflammatory effects of exercise are collectively referred to as delayed-onset muscle soreness (DOMS).
- DOMS can result in decreased motivation to be active

Cannabis for DOMS

- As you've learned, there is emerging evidence that cannabis reduces pain, muscle spasms, stiffness, and inflammation in humans

- Inflammation is definitely associated with soreness, stiffness, and fatigue following exercise

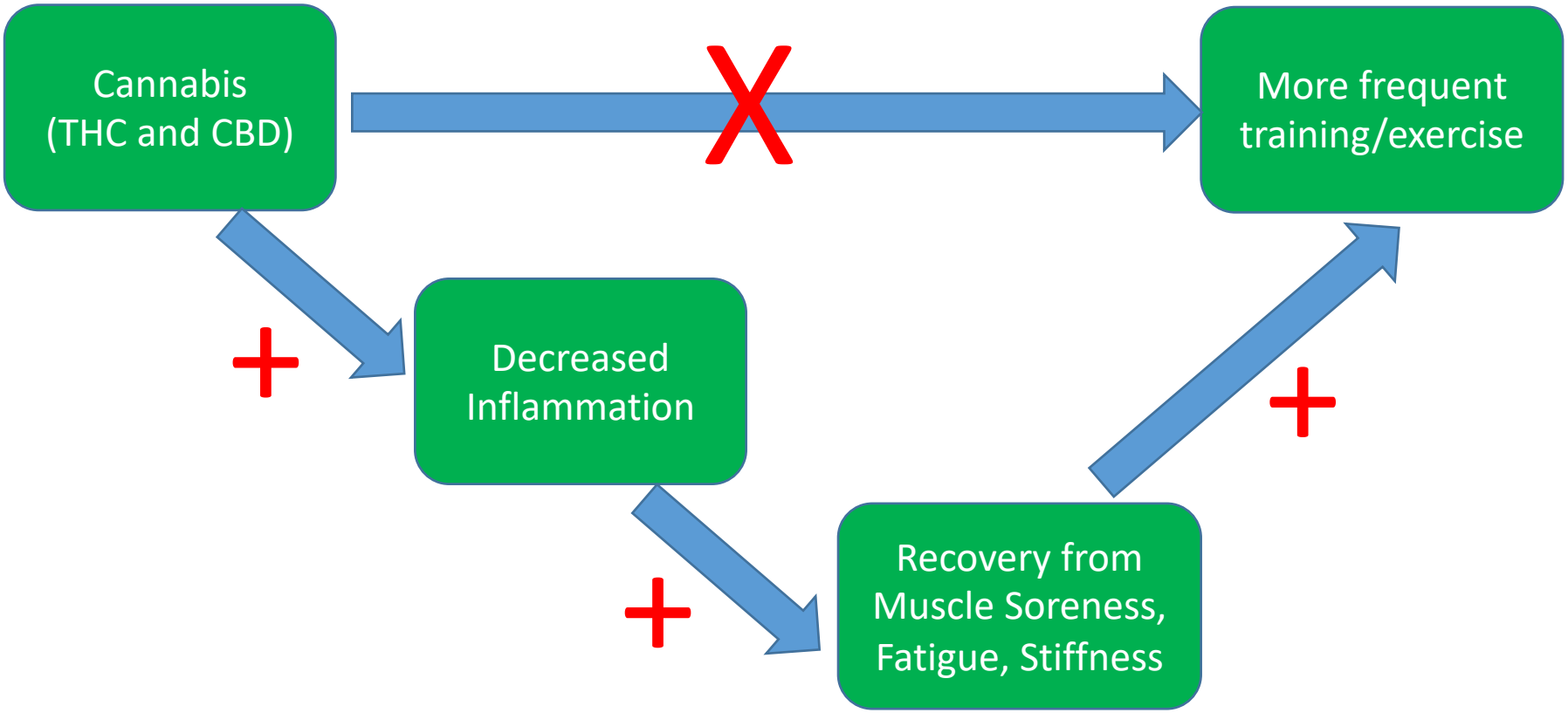
- So it makes sense that exercisers and athletes might use cannabis to reduce these symptoms.

Cannabis for DOMS

- Animal studies suggest cannabinoids modulate pro-inflammatory cytokines, including TNFα, IL-1a, IL-1B and CXCL8
- A few studies in humans show cannabis was associated with reductions in IL-6 and TNFα
- So it is possible that cannabis might aid in recovery from DOMS through these mechanisms

Cannabis for DOMS: The Evidence

Cannabis for DOMS: The Evidence



- Bottom line: While each link has support in isolation, the scientific evidence for positive effects of cannabis on exercise recovery is indirect at best

Risks of cannabis and exercise: Muscle adaptation

- HOWEVER, as with other anti-inflammatory aids (i.e., ibuprofen), if cannabis is used DURING exercise, it may reduce exercise-induced skeletal muscle adaptations
- The inflammatory process during exercise is part of how muscle adaptation to training occurs

M. MACHIDA, T. TAKEMASA

JOURNAL OF PHYSIOLOGY AND PHARMACOLOGY 2010, 61, 5, 559-563

IBUPROFEN ADMINISTRATION DURING ENDURANCE TRAINING CANCELS RUNNING-DISTANCE-DEPENDENT ADAPTATIONS OF SKELETAL MUSCLE IN MICE

Risks of Cannabis and exercise: Bone Mineral Density

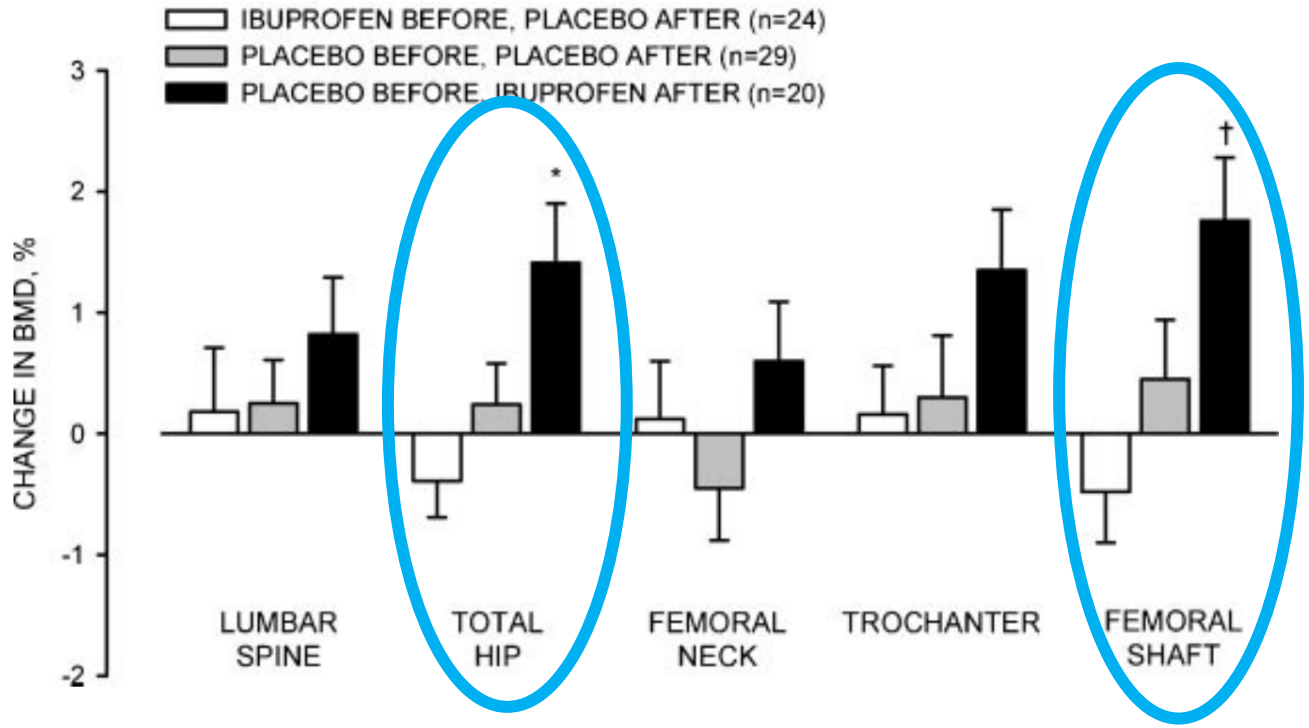
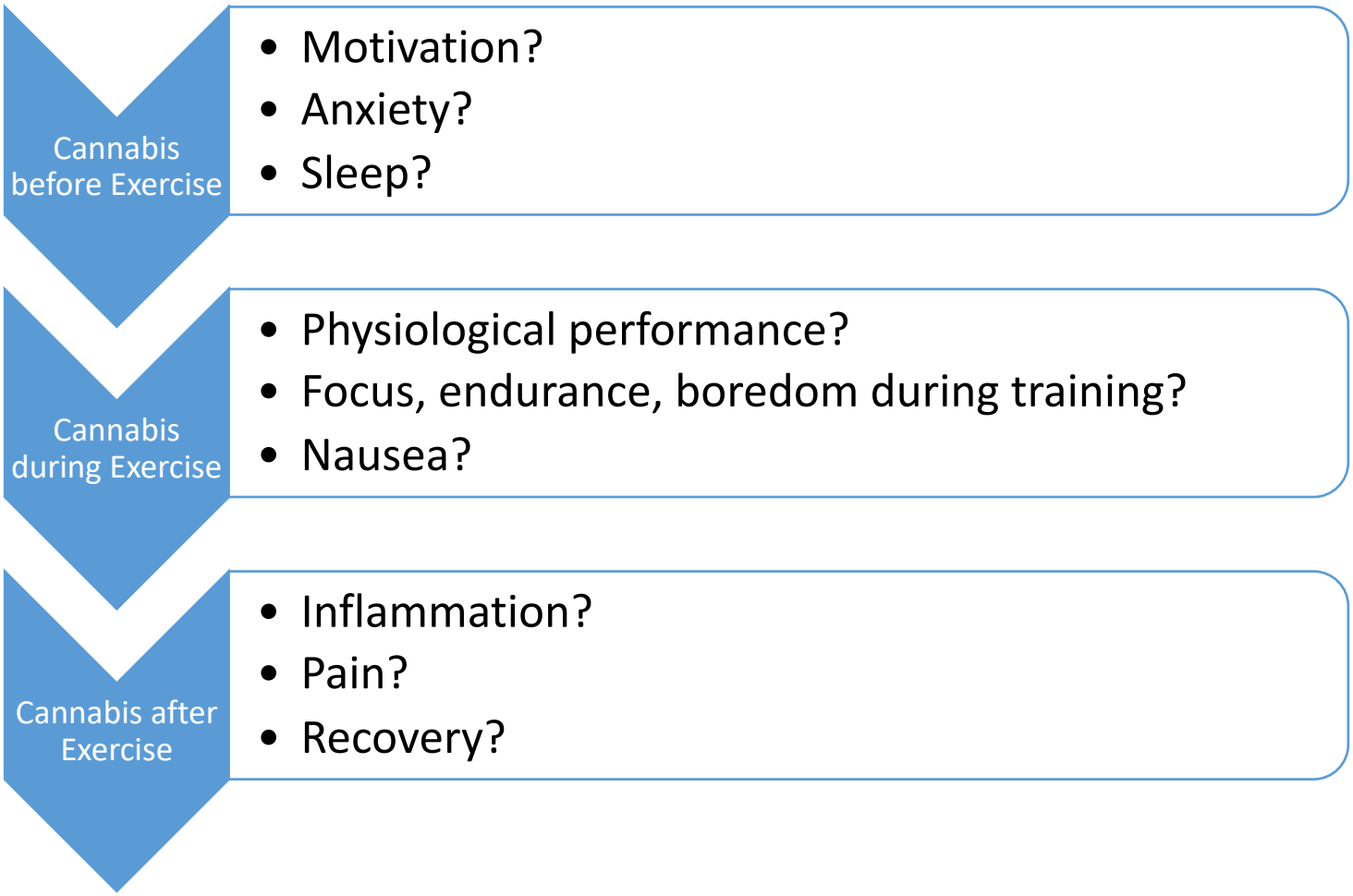


Fig. 2. Relative changes (%) in bone mineral density (BMD) adjusted for baseline BMD in response to exercise training in participants who were compliant with the intervention (*top panel*) and in all participants who finished the intervention (*bottom panel*). Values are mean ± SE. *Different from the other groups, $p \leq .01$. †Different from the other groups, $p \leq .05$.

- Kohrt et al. (2010) found that taking anti-inflammatory drug after exercise enhances the adaptive response to exercise, whereas taking them before exercise may impair the adaptive response

Lots of research to be done!



Summary – Part 1

- Likely that cannabis is helpful for aiding in recovery from exercise
  - Lessens inflammation and pain
  - Allows the athlete or even the weekend warrior to be more consistent in their training or exercise
    - May have positive effects on delayed-onset muscle soreness
- As we'll discuss in the next module, this might be particularly important for subgroups for whom exercise is critical
    - Rheumatoid Arthritis patients, Multiple Sclerosis patients, Older adults

Summary – Part 2

- While it is likely that cannabis may be helpful if taken AFTER exercise, it might not be a good idea to take DURING exercise

- Results with other anti-inflammatory drugs (e.g., ibuprofen) suggest caution
  - Use of anti-inflammatory meds during exercise reduces muscle adaptation to endurance training
  - Use of anti-inflammatory meds during exercise reduces bone density adaptation to strength training