



OPTIMISING NUTRITION FOR FEMALE SOLDIERS

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10 SEPT 19

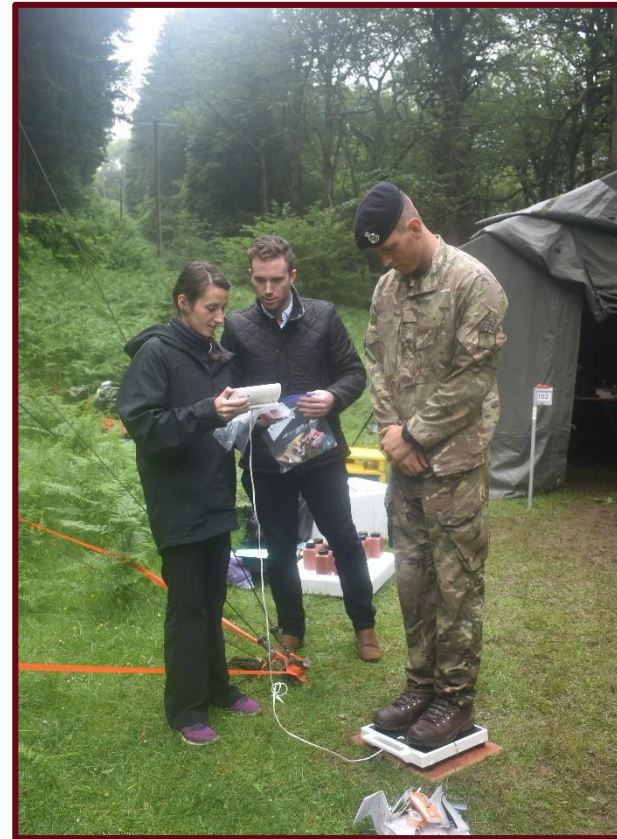


ARMY HEALTH AND PHYSICAL PERFORMANCE RESEARCH

ENHANCING RESILIENCE WITH NUTRITION



**ADAPTATION TO
TRAINING**



**RECOVERY FROM
ARDUOUS
EXERCISE**



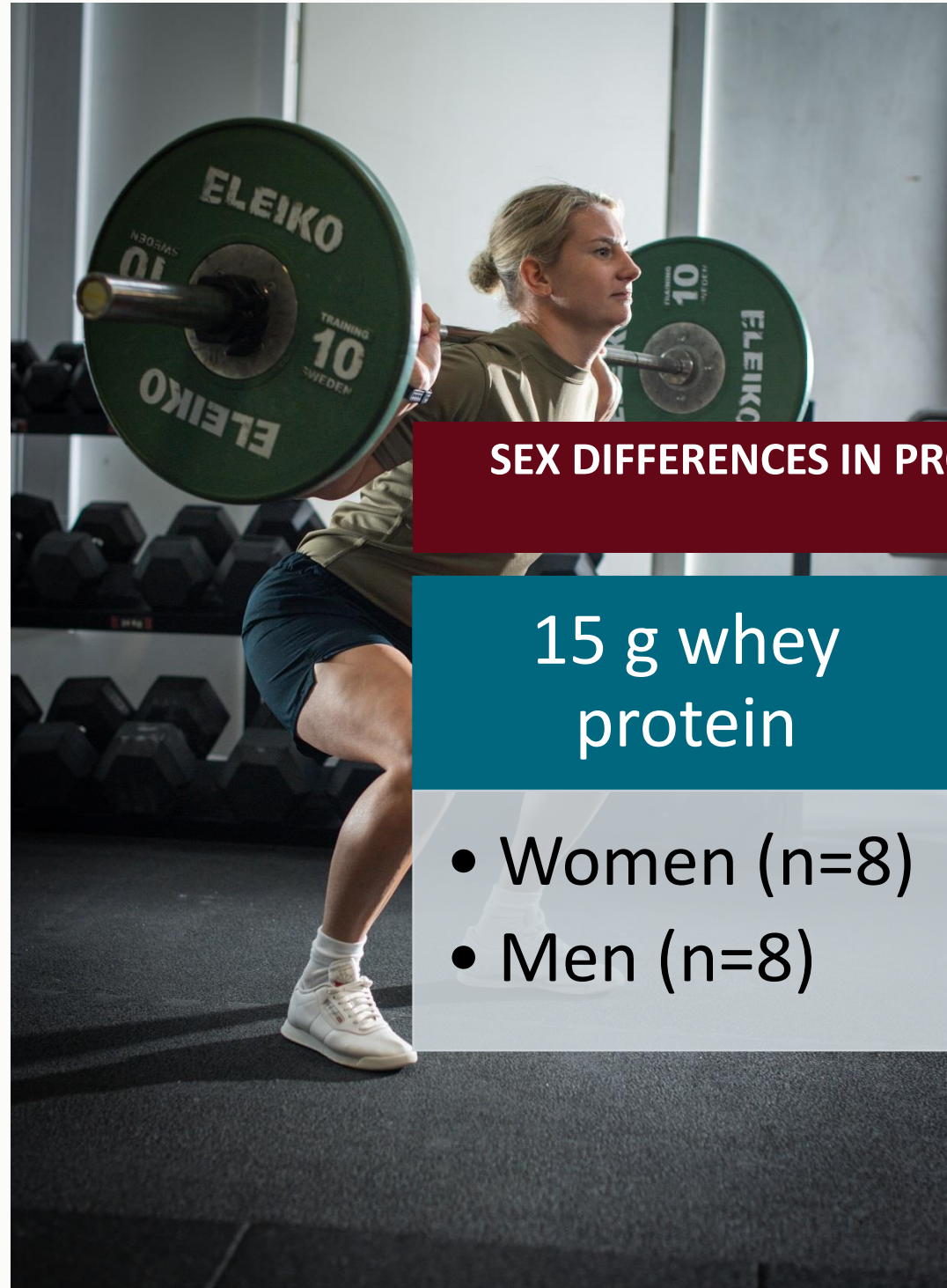
**INJURY
PREVENTION**

PROTEIN FOR ADAPTATION TO, AND RECOVERY FROM, EXERCISE

- Protein intake is important for **promoting training adaptations** and **recovery** from arduous activity.
- Men and women may have **different protein requirements** due to differences in muscle mass and hormonal profiles.
- **The protein requirements of women are unknown** and the RDA for protein is unlikely to be adequate for military personnel.
- Increasing protein intake during arduous military training may be effective for **attenuating muscle protein breakdown** and preserving muscle mass / function.



SEX DIFFERENCES IN PROTEIN DOSE REQUIREMENTS



ADAPTATION TO TRAINING

SEX DIFFERENCES IN PROTEIN DOSE REQUIREMENTS TO OPTIMISE MUSCLE PROTEIN SYNTHESIS

15 g whey protein

- Women (n=8)
- Men (n=8)

30 g whey protein

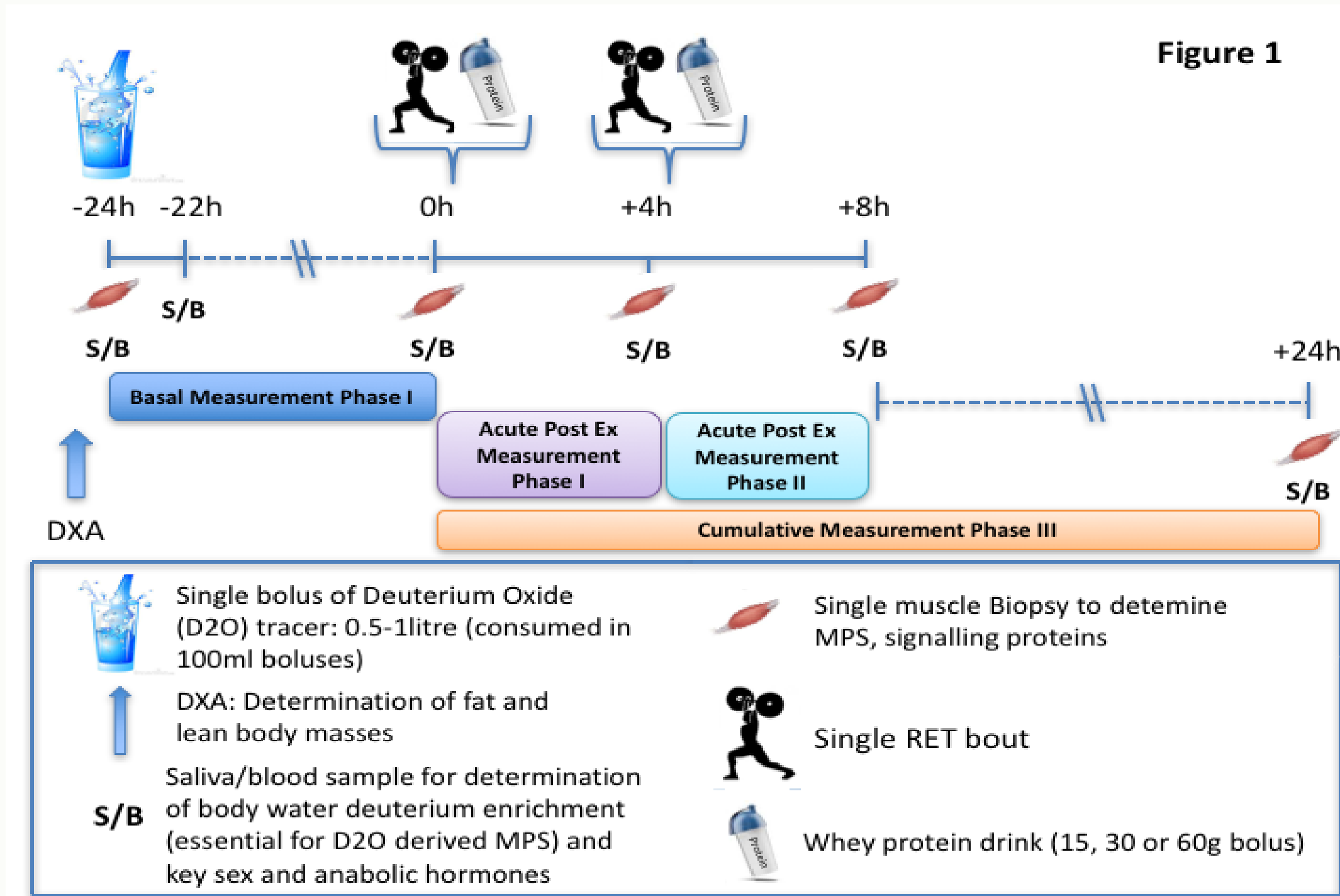
- Women (n=8)
- Men (n=8)

60 g whey protein

- Women (n=8)
- Men (n=8)

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SEX DIFFERENCES IN PROTEIN DOSE REQUIREMENTS



UNIVERSITY OF NOTTINGHAM

PROJECT ADAPT: ARDUOUS TRAINING AND PROTEIN TURNOVER

RECOVERY FROM ARDUOUS EXERCISE

SEX DIFFERENCES IN PROTEIN TURNOVER

CON-W

- Women (n=15)
- No intervention

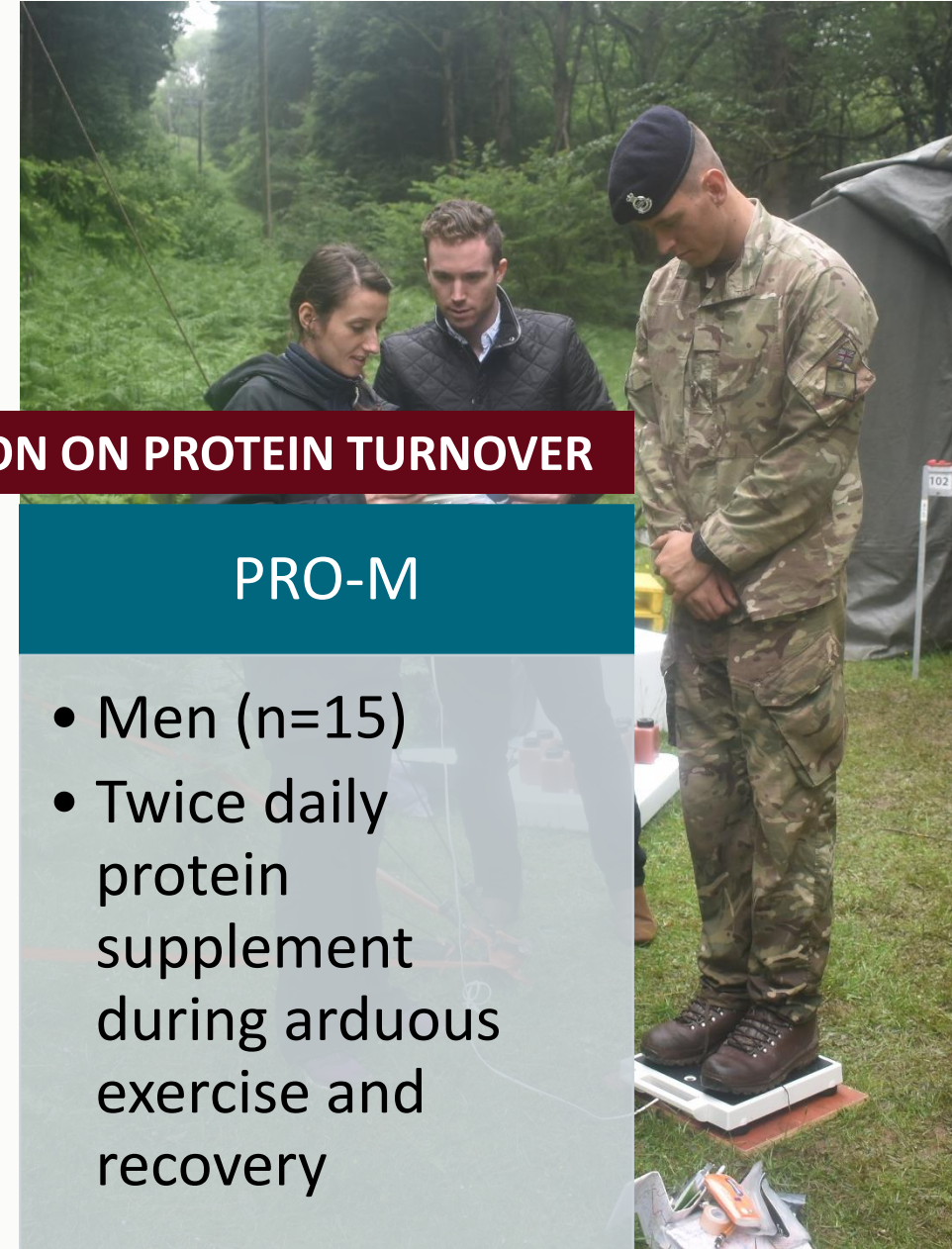
CON-M

- Men (n=15)
- No intervention

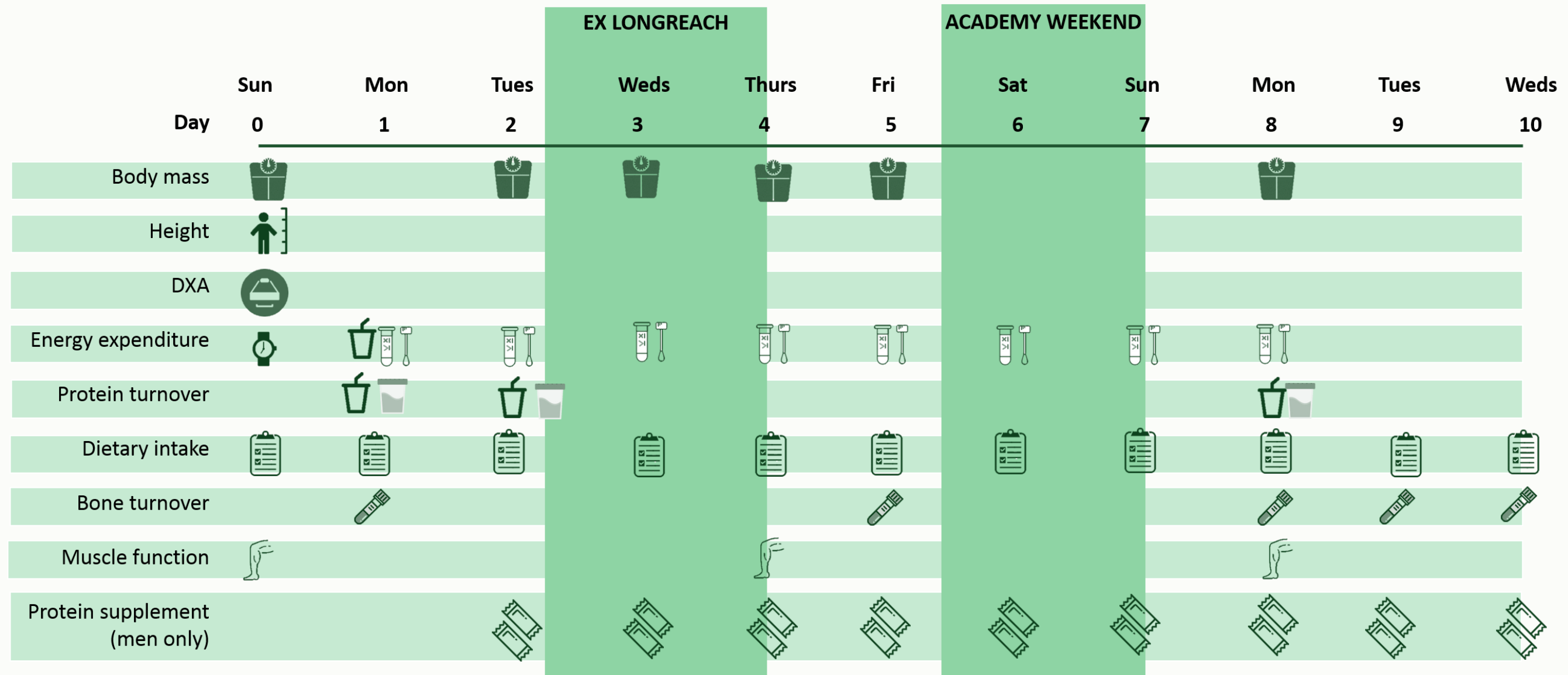
EFFECT OF PROTEIN PROVISION ON PROTEIN TURNOVER

PRO-M

- Men (n=15)
- Twice daily protein supplement during arduous exercise and recovery

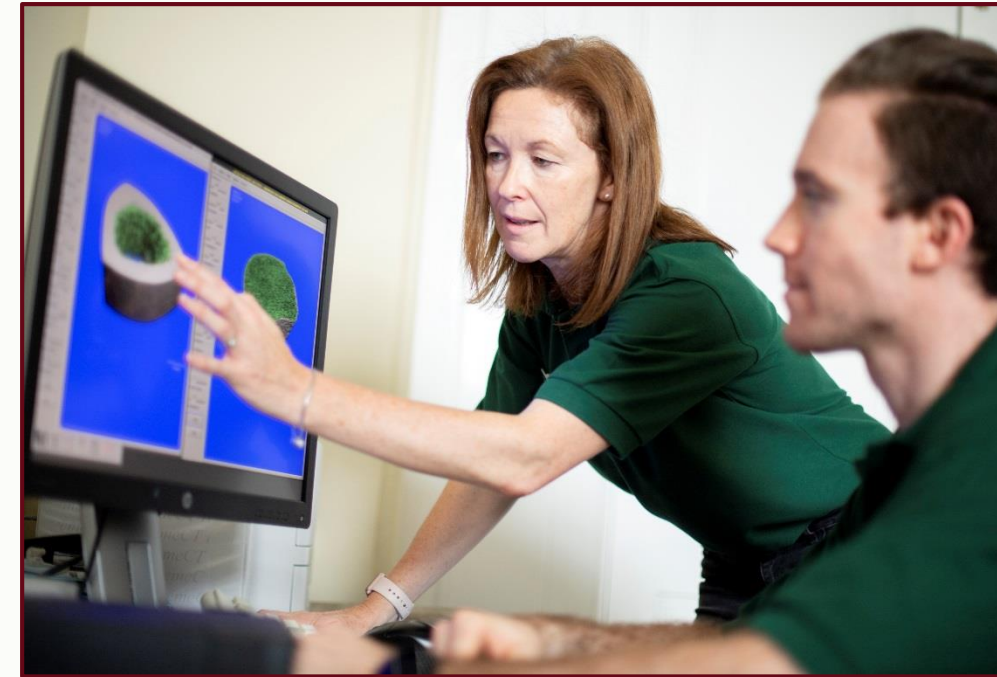


ARMY HEALTH AND PHYSICAL PERFORMANCE RESEARCH

PROJECT **ADAPT**: **ARDUOUS** TRAINING **AND** **PROTEIN** **TURNOVER**

ARMY HEALTH AND PHYSICAL PERFORMANCE RESEARCH

TECHNIQUES FOR EVALUATING NUTRIENT REQUIREMENTS



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NUTRITION FOR INJURY PREVENTION: ENERGY



- Adequate **energy intake** is important for female health and performance.
- Two main consequences of energy deficit are **compromised bone health** and a **loss of menstrual function**.
- Energy requirements of a combat soldier in training exceed 4500 kcal/d.
- The consequences of negative energy balance may be more severe in women than men.

NUTRITION FOR INJURY PREVENTION: GELATIN

How to use gelatin to promote collagen synthesis



To treat injuries


Gelatin: a food source with similar amino acids found in collagen.

Consuming **15 grams of gelatin** one hour before 6 minutes of jump rope resulted in a 2-fold greater increase in collagen synthesis than intermittent exercise for 6 minutes on its own.

Ingest gelatin **1 hour before 5-6 minute protective session**
At least 6 hours before or after other training

Jumping rope for 6 min with gelatin resulted in 2-fold greater increase in collagen synthesis than jumping only.

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NUTRITION FOR INJURY PREVENTION: IRON



- Iron requirements are **greater in women** compared to men due to iron loss during menstruation.
- Iron levels **decrease** during basic military training (McClung *et al.*, 2009).
- The decrease in iron during military training may be due to an **inflammation**-induced increase in hepcidin (Karl *et al.*, 2010; McClung *et al.*, 2013).
- Providing an **iron supplement** attenuated the decrease in iron levels during military training and maintained physical and cognitive performance compared to non-supplement controls (McClung *et al.*, 2009).

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NUTRITION FOR INJURY PREVENTION: CALCIUM AND VITAMIN D

- Female military trainees are at **increased risk of stress fracture injuries** compared to male military trainees.
- Calcium and Vitamin D are important nutrients for **bone health**.
- **Higher circulating 25(OH)D levels may be required in women** compared to men to reduce the risk of stress fracture injuries (McClung & Gaffney-Stomberg, 2016).
- Female Navy recruits consuming supplemental calcium and vitamin D had a **20 % reduction in stress fracture injury risk** than those taking a placebo supplement (Lappe *et al.*, 2008).



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SUMMARY

- **Women may have different nutrient requirements to men**, some of which are exacerbated by arduous military training.
- Nutrition can be used to **enhance resilience of servicewomen** (and men) by supporting:
 - Adaptation to training
 - Recovery from arduous exercise
 - Injury prevention
- Defence are **closing the gender data gap** by conducting research on both men and women to better understand sex-specific requirements.
- **The ProtectHER, TrainHER and FeedHER work packages aim to identify optimal preventative, training and feeding strategies / treatments to prepare women for the demands of combat employment and reduce injury risk.**

ARMY HEALTH AND PHYSICAL PERFORMANCE RESEARCH QUESTIONS

