

UK Gut-Immune-Brain Axis Network+



Fill My Belly to Empty Belly: ECR to Lab Lead in 3.6 years
and Counting

Dr Lewis R Mattin



UNIVERSITY OF
WESTMINSTER



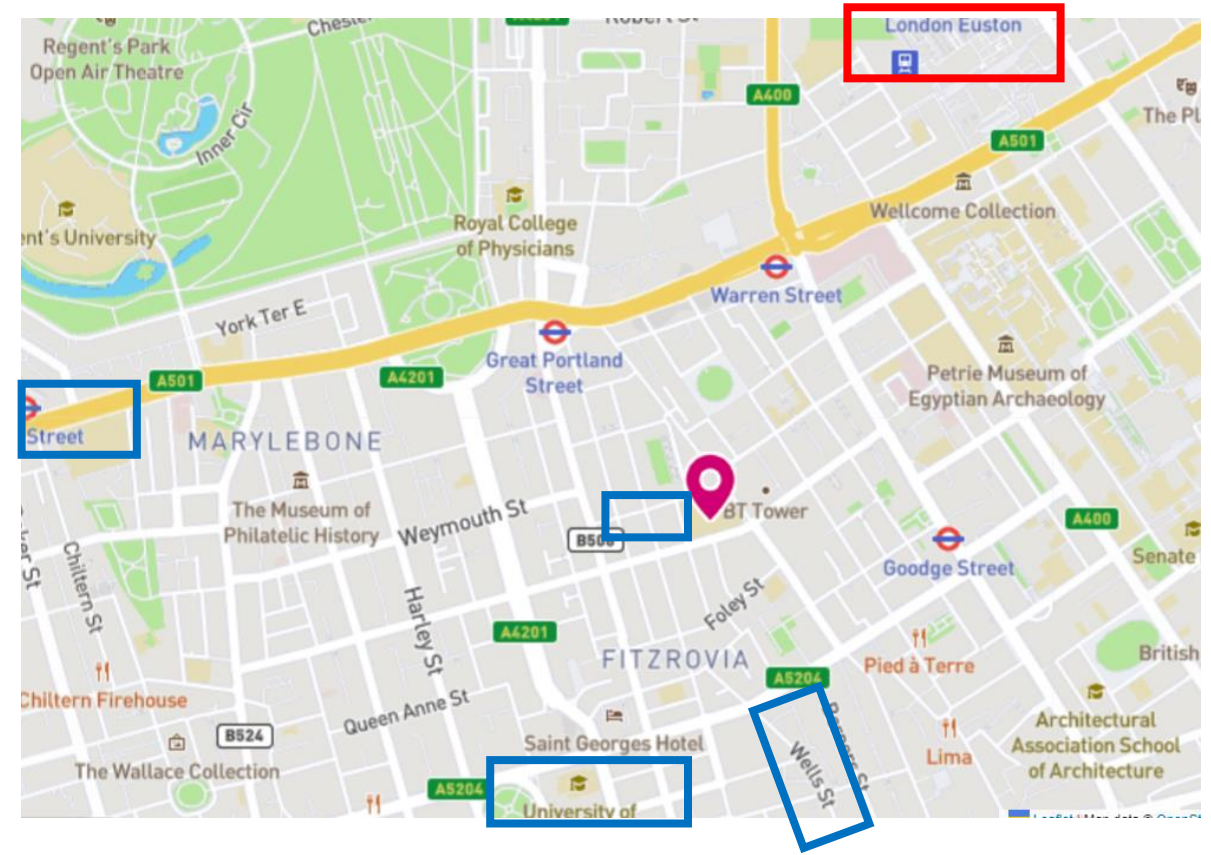
Dr Lewis-Mattin



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University of Westminster location

School of Life Sciences- New Cavendish Campus

Lewis Mattin: Stretching boundaries and leaving our comfort zones

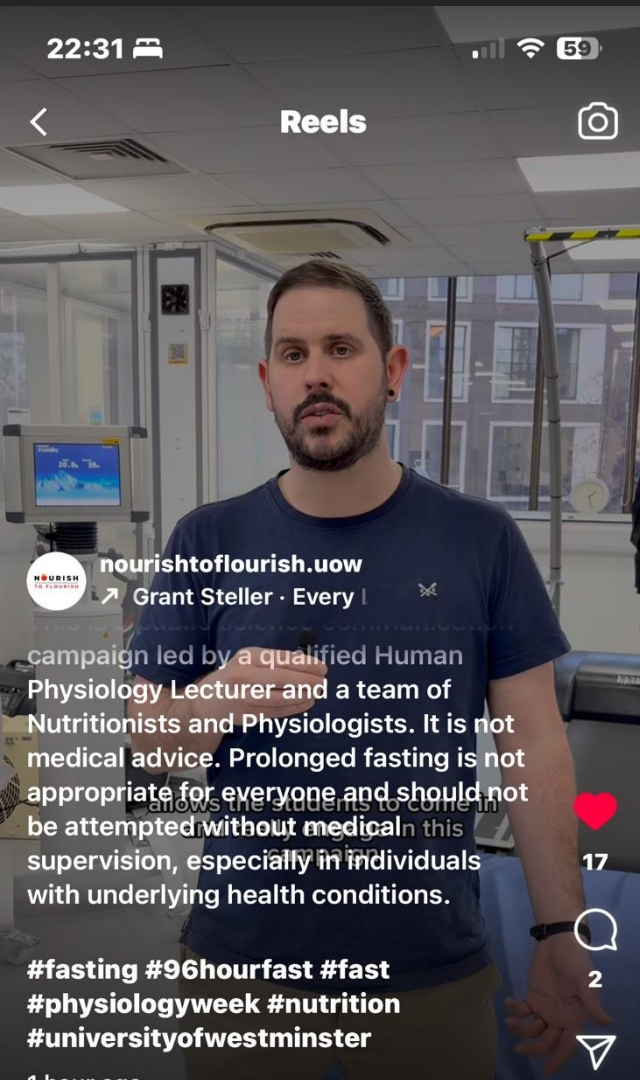
**Science
with both
hands and
feet tied
behind my
back +
Outreach**

19 August 2025

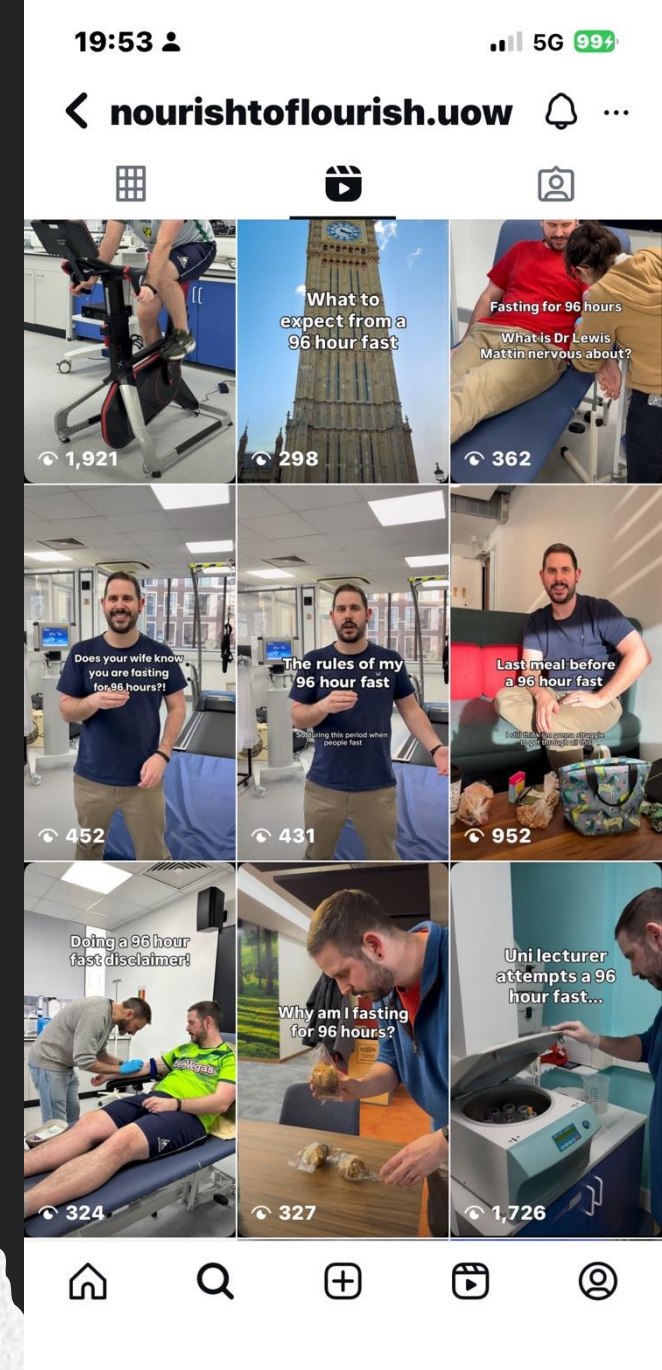


By EDI Committee Member, Dr Lewis Mattin

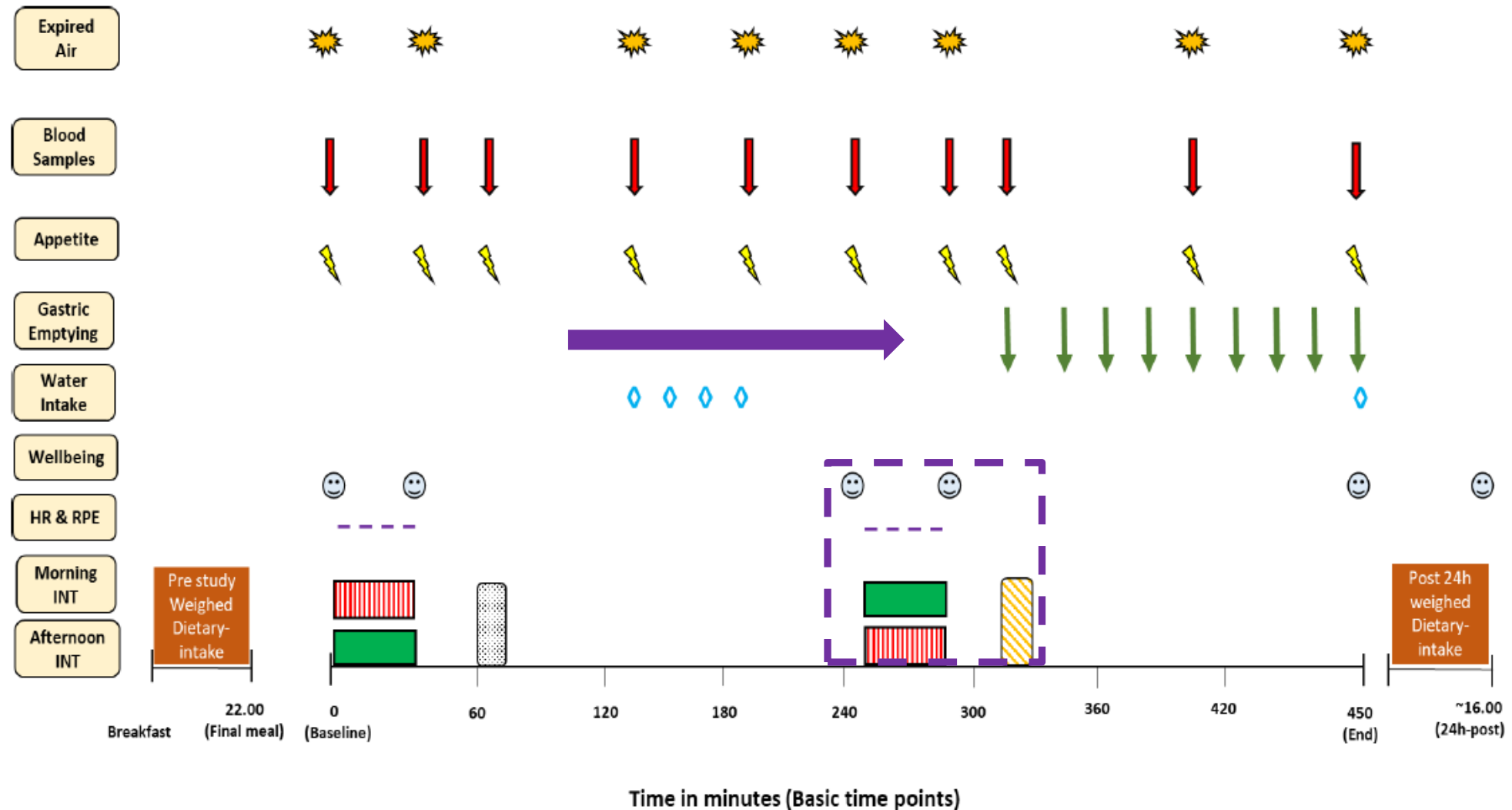




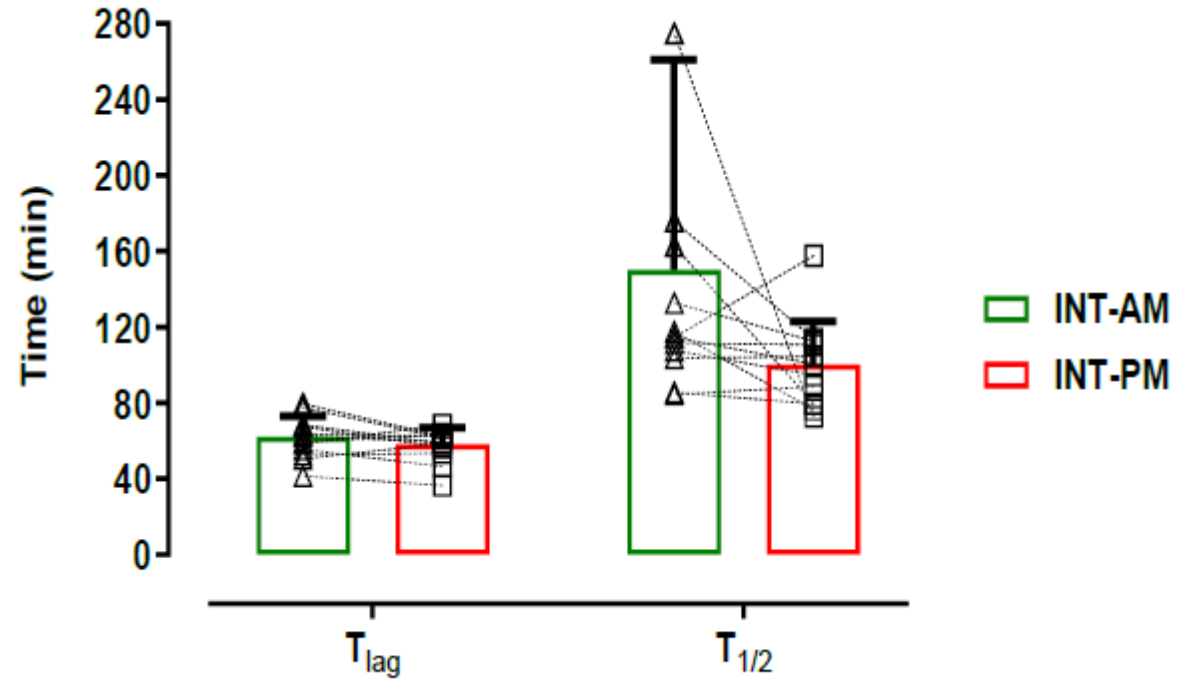
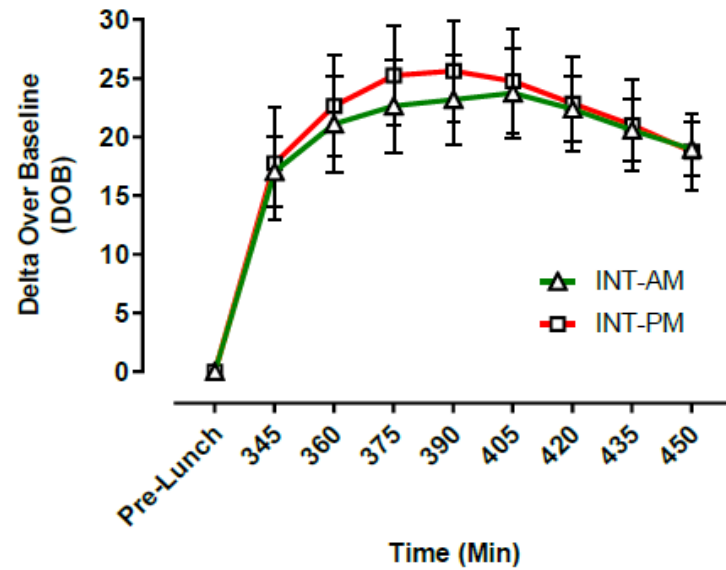
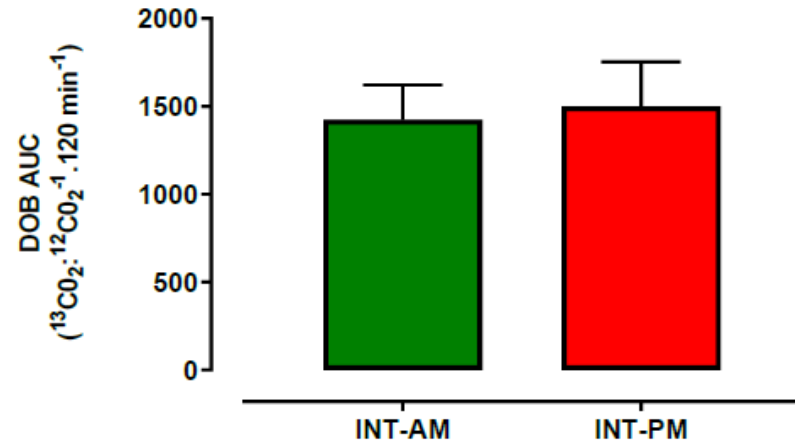
96-h Fast for Science



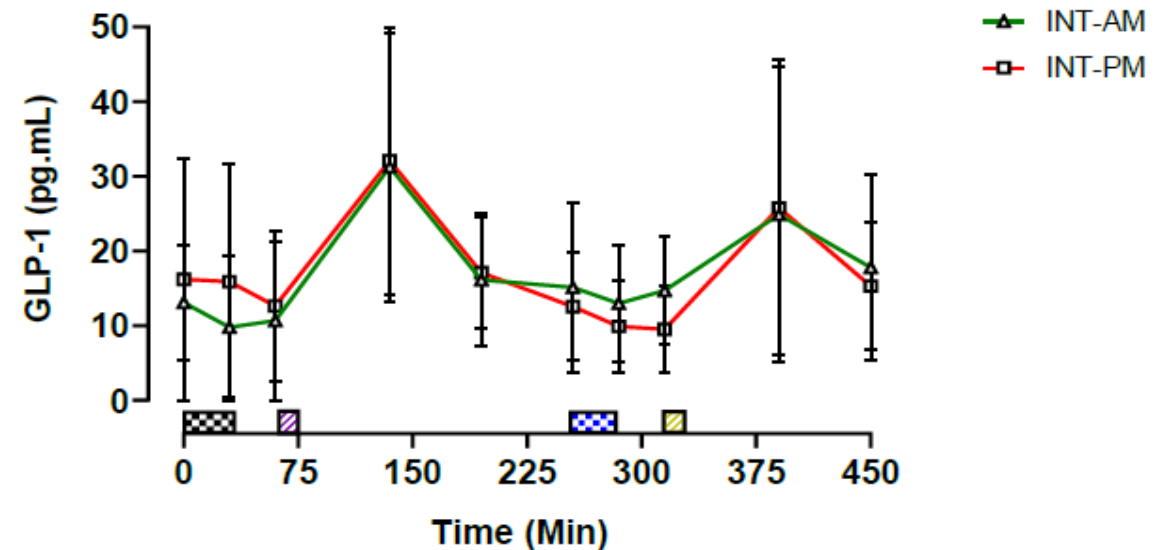
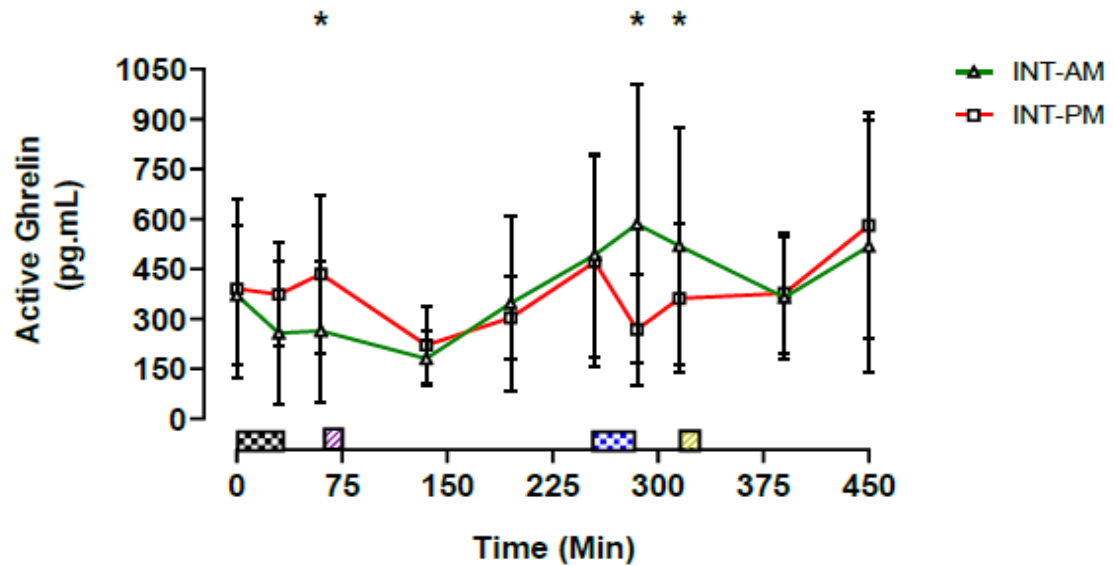
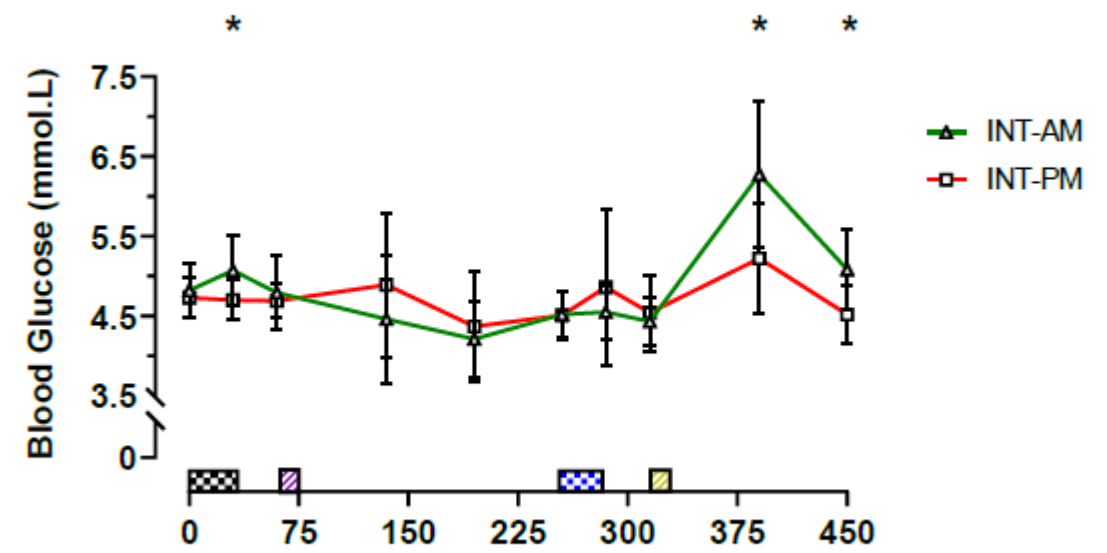
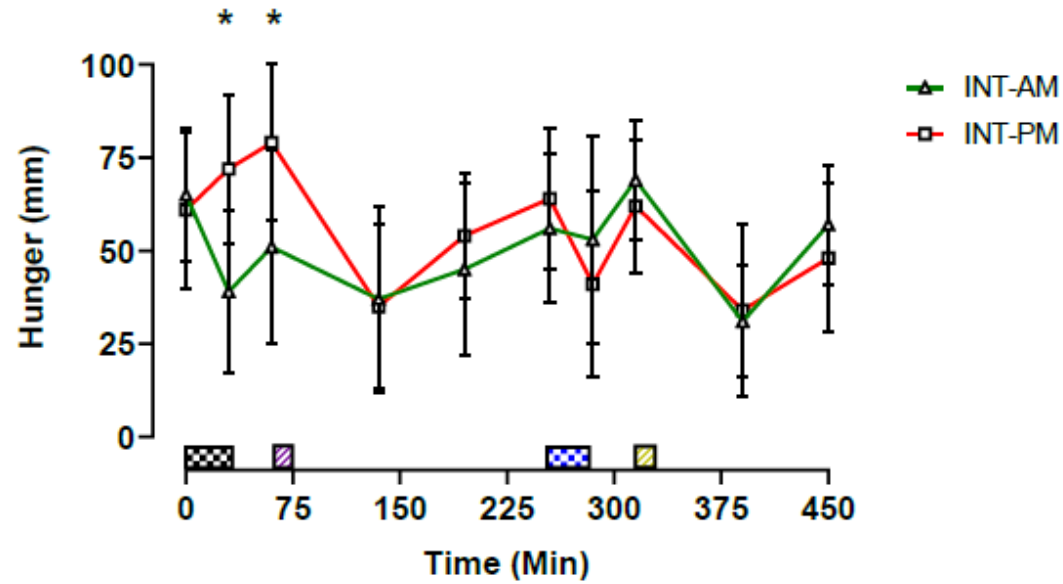
Does Exercise Pattern Matter? Comparing Continuous and Intermittent Bouts on GI, Appetite, and Metabolic Responses in Healthy Males



Gastric Emptying rate



GI & Metabolic Response



Energy Intake

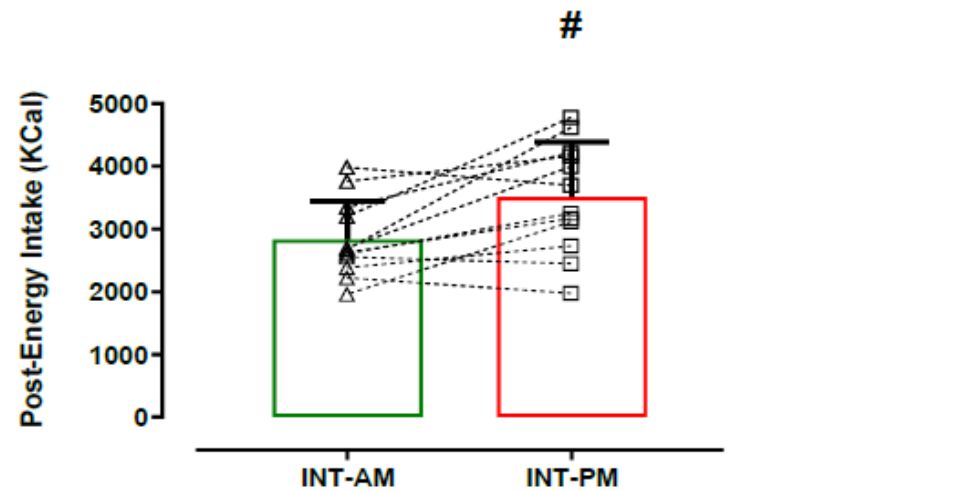
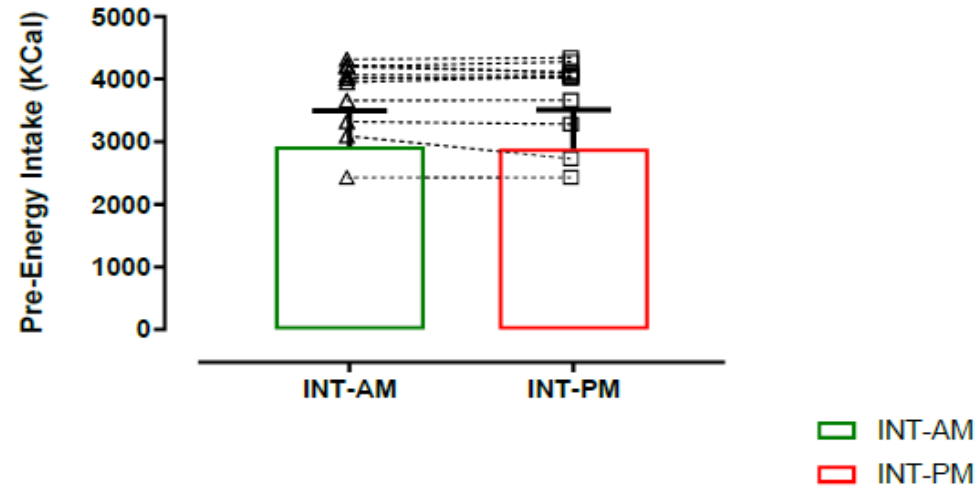


Table 18: Pre and post-trial macronutrient content (KCal) from total energy intake for INT-AM and INT-PM trial.

Macronutrients	INT-AM	INT-PM	P=
Pre-Trial Macronutrients (KCal)			
Carbohydrate	1313 ± 385	1290 ± 409	0.625
Protein	502 ± 231	508 ± 217	0.841
Fat	1048 ± 336	1030 ± 361	0.772
Fibre	58 ± 40	59 ± 33	0.910
Water (g)	2251 ± 1667	2216 ± 1428	0.848
Post-Trial Macronutrients (KCal)			
Carbohydrate	1227 ± 428	*1593 ± 464	0.018
Protein	466 ± 134	553 ± 253	0.163
Fat	1026 ± 388	1254 ± 557	0.140
Fibre	81 ± 54	95 ± 50	0.061
Water (g)	1971 ± 1430	2063 ± 1148	0.577

Data are means ± SD. Values are significant $P < 0.05$

* Indicates INT-PM is significantly larger than INT-AM.



High-intensity continuous exercise elevates I-FABP₂ levels equally across 30 and 60-minute durations in healthy males.

Lewis R Mattin¹ Victoria J McIver² Adora MW Yau³ & Gethin H Evans³

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Relevance of Research

- Intestinal fatty acid binding protein two (I-FABP₂) is a small 15 kDa protein expressed in epithelial cells of the mucosal layer of the small and large intestines (Agellon et al., 2007).
- When mucosal damage occurs, I-FABP₂ is released and plasma concentration increases (Pugh et al., 2017).
- Disrupting gastrointestinal function and appetite regulation after exercise.

Heart Failure Reviews (2025) 30:1251–1263
<https://doi.org/10.1007/s10741-025-10546-7>

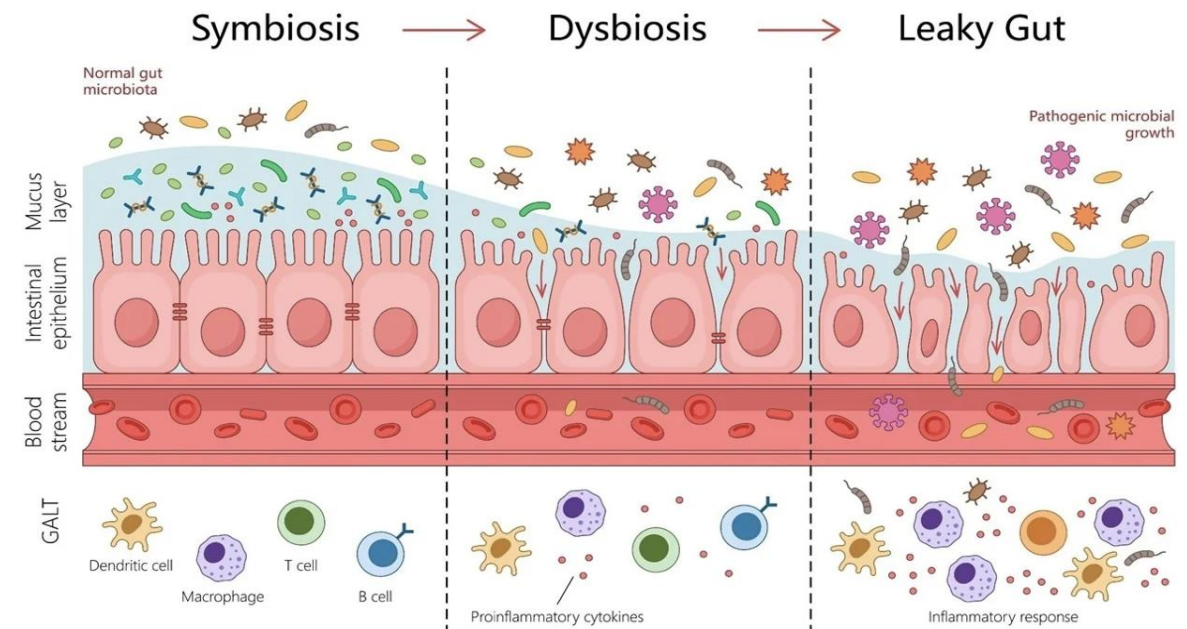
REVIEW



The role of the gut microbiota and metabolites in heart failure and possible implications for treatment

Ahmed Emad Ahmed Shoukry¹ · Alaa Rahhal² · Constantina Constantinou¹

Accepted: 8 July 2025 / Published online: 25 July 2025
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Subject Characteristics

Males (<i>n</i> =14) [*]	
Age, y	27 ± 6
Height, m	1.79 ± 0.09
Weight, Kg	79.3 ± 10.4
BMI, kg/m ²	24.9 ± 2
Body fat, %	18.5 ± 4.1
Systolic BP, mmHg	133 ± 14
Diastolic BP, mmHg	74 ± 9
V02max, ml/kg/min	42 ± 9
Exercise Intensity, W	164 ± 37
ETEE, Kcal	556 ± 53

¹ Values are means ± SDs

* Two subjects withdrew from the study
ETEE; Estimated trial energy expenditure

Subject characteristics comparison			
	VO ₂ ml/kg/min	BMI kg/m ²	Body Fat %
Alajmi et al (2016)	66.1 ± 9.2	22.8 ± 0.4	
Broom et al (2007)	63.3 ± 2.0	22.2 ± 0.7	
King et al (2013)	61.5 ± 4.8	23.9 ± 2.3	14.9 ± 3.2
King et al(2010)	60.5 ± 1.5	23.6 ± 0.4	17.8 ± 1.7
King et al (2011)	57.3 ± 1.2	23.1 ± 2.1	10.1 ± 4.2
Crabtree et al (2014)	32.1 ± 6.5	28.9 ± 4.2	26.4 ± 6.1

VO₂ ↓ BMI & Body Fat ↑

This study aimed to investigate the effect of high-intensity continuous exercise at two different durations, 30 and 60 minutes, on I-FABP₂ responses in healthy male participants.

Results – Heart Rate & RPE

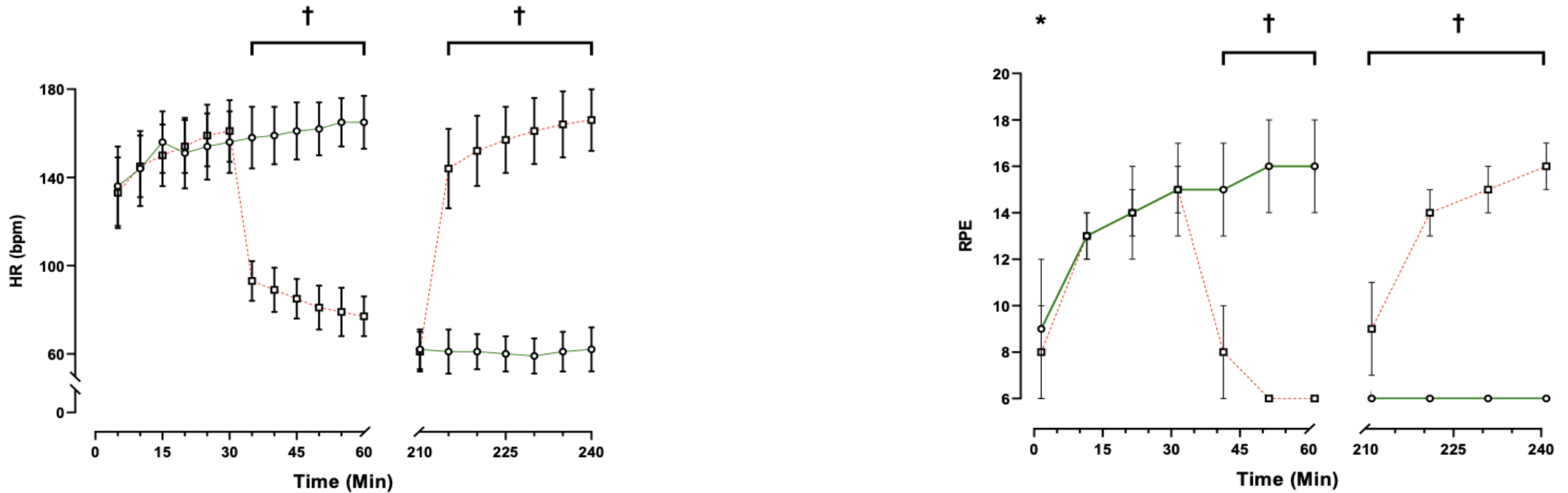


FIGURE 2- Representative of mean HR and RPE, with vertical error bars display SDs. (n = 14). There was a main effect for trial, time and a main interaction effect ($p < 0.05$) for HR and RPE during exercise, examined by a two-way repeated-measured ANOVA. † Indicates, SINGLE vs SPLIT was significantly different? at each time point ($p < 0.001$). *Indicates, SINGLE vs SPLIT was significantly different ($p < 0.05$). Post-hoc tests were determined by Bonferroni adjusted paired *t-test*. RPE; rate of perceived exertion. HR, heart rate; bpm, beats per minute.

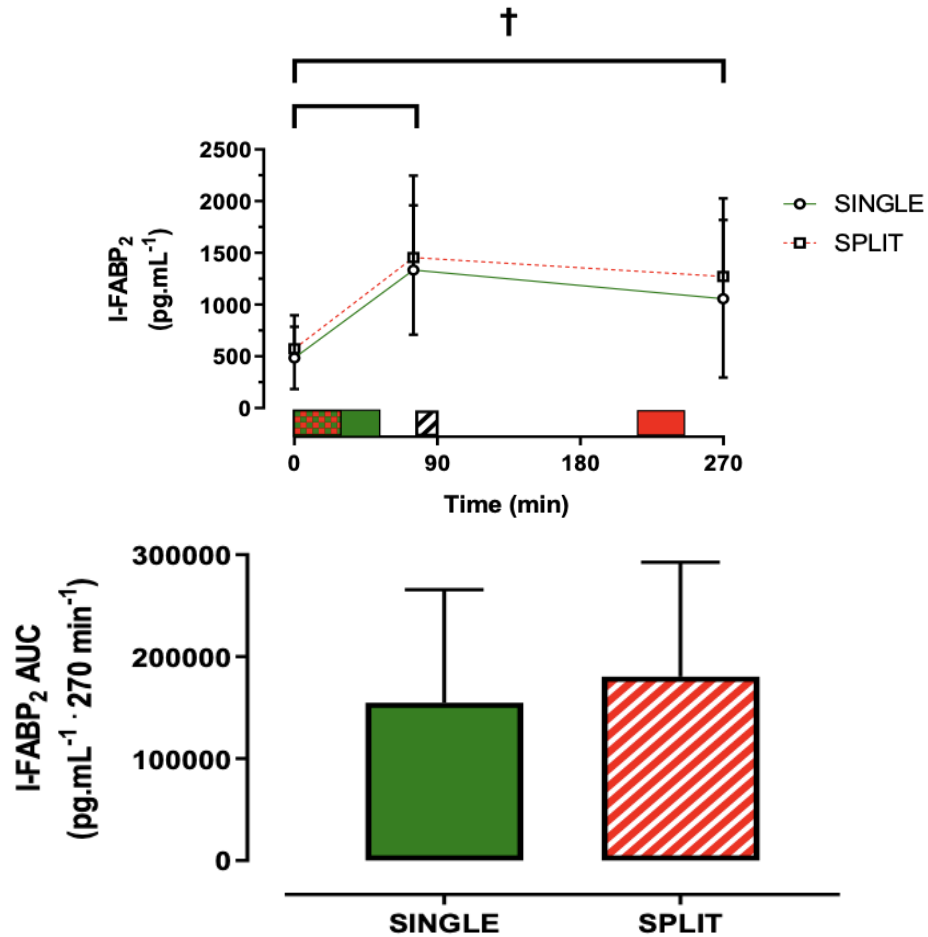
Average HR (60-min)

156 ± 14

154 ± 14

$P = 0.534$

Results– I-FABP₂ & Appetite



Representative of mean I-FABP₂-AUC (0-270 min⁻¹) (A) and I-FABP₂ response (B), with vertical error bars display SDs (n = 14). Chequered red and green rectangle indicates 30-min exercise period; Filled green rectangle indicates the remaining 30-min exercise period of the 60-min single bout; Hashed black rectangle indicates 30% ETEE milk-drink and red rectangle indicates 30-min exercise period for split. There was no main effect observed for I-FABP₂ AUC ($p > 0.05$), examined by a one-way repeated-measured ANOVA. There was no main effect for trial nor main interaction effect ($p < 0.05$). However, a main effect for time was observed ($p < 0.001$), examined by a two-way repeated-measured ANOVA. † Indicates a significant increase for time from baseline to 75 and 270 min within SINGLE vs SPLIT, determined by Bonferroni adjusted paired t-test ($p < 0.001$). I-FABP₂; Intestinal fatty acid binding protein 2.

Conclusion

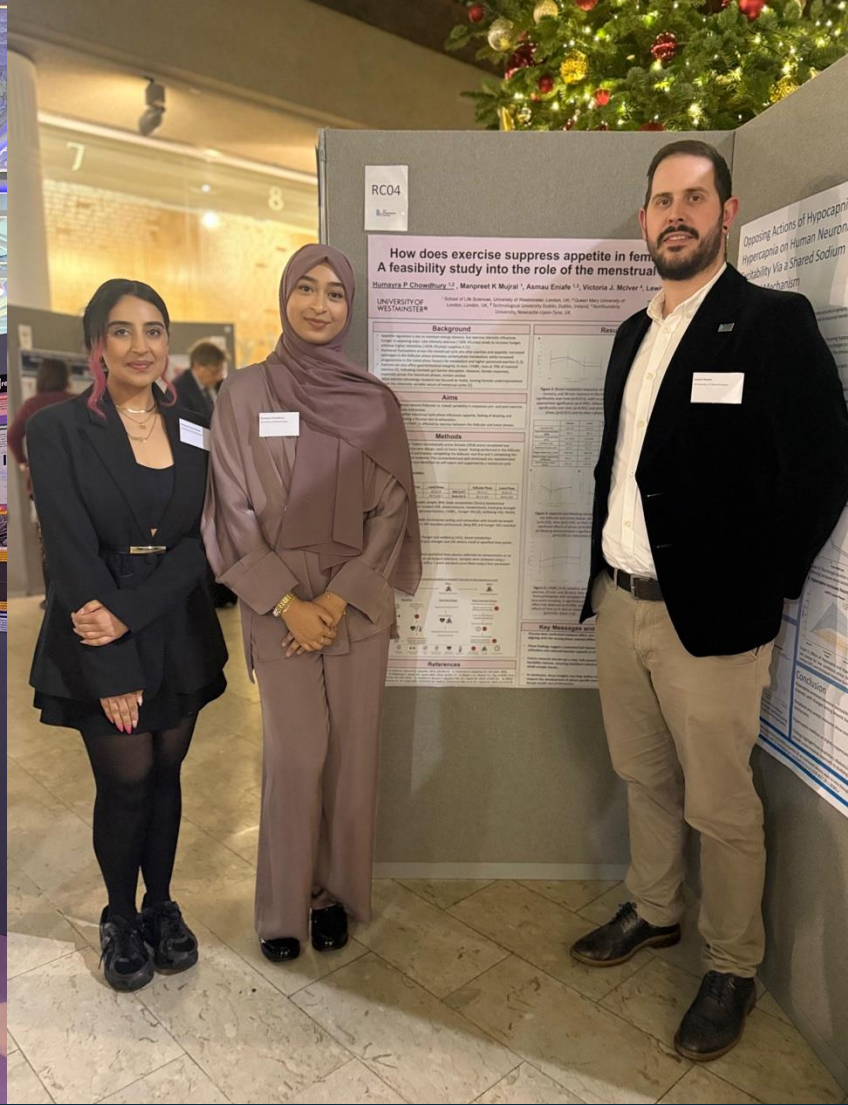
Strenuous exercise $> 70\% \text{ V}_{O_{2\max}}$ for longer than 60 minutes
(Pugh et al., 2017, Barberio et al., 2015, van Wijck et al., 2012, van Wijck et al., 2011).

Intestinal cellular injury might occur after exercise for various physiological reasons.

- Heart
- Hypoperfusion
- Oxidative Stress
- Mechanical Damage
- Nutrient Delivery



30 min of high-intensity exercise was sufficient to increase intestinal cellular injury and compromise cell membrane integrity to the same extent as 60 min in a healthy population.



Female Gastrointestinal Physiology

How does exercise suppress appetite in females? A feasibility study into the role of the menstrual cycle.

Humayra P Chowdhury^{1,2}, Manpreet K Mujral¹, Asmau Eniafe^{1,3}, Victoria J. McIver⁴, Lewis R Mattin¹

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¹ School of Life Sciences, University of Westminster, London, UK; ² Queen Mary University of London, London, UK; ³ Technological University Dublin, Dublin, Ireland; ⁴ Northumbria University, Newcastle-Upon-Tyne, UK



Participants & design: Twelve recreationally active females (29±8 years) completed two laboratory visits in a cross-over design, each ≥2 hours fasted. Testing performed in the follicular and luteal phases with 6 participants completing the follicular visit first and 5 completing the luteal visit first, assigned randomly. This counterbalanced split minimised any repeated bout effect. Menstrual phase was identified via self-report and supported by a menstrual cycle questionnaire.

How does exercise suppress appetite in women? The role of the menstrual cycle

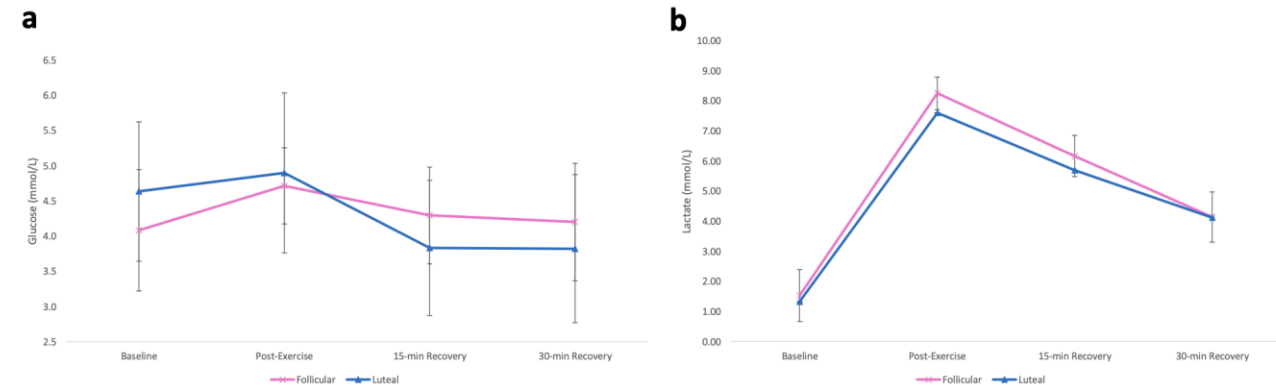
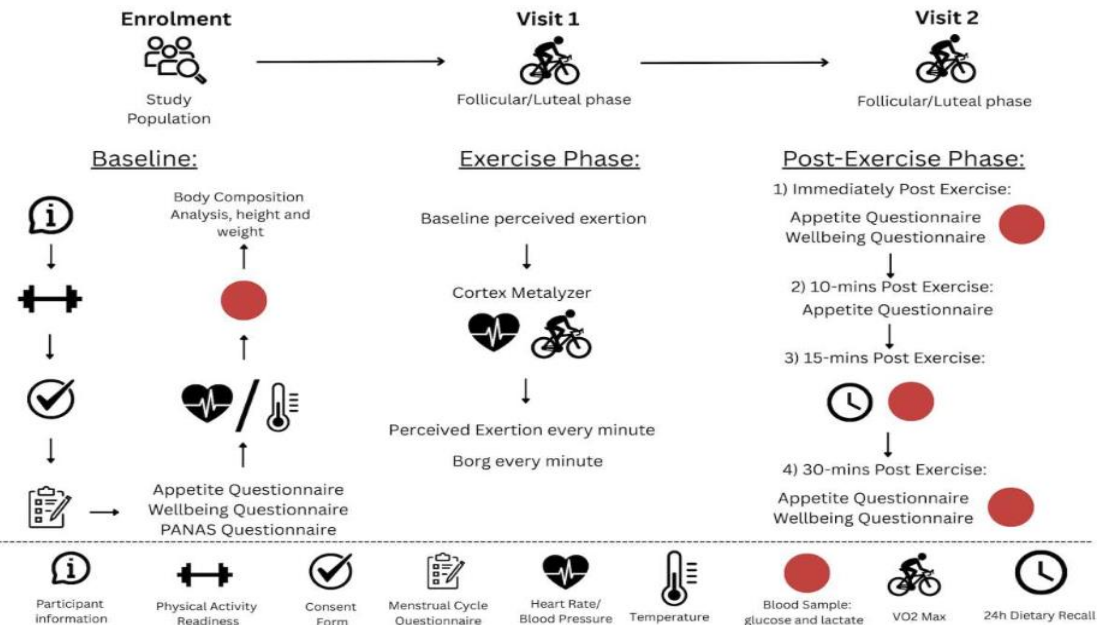


Figure 2: Blood metabolite responses across baseline, immediately post-exercise, 15-min recovery, and 30-min recovery in the follicular and luteal phases. **(a)** Glucose changed significantly over time ($p=0.013$), with no phase effect ($p=0.931$); the time $\times$ phase interaction approached significance ($p=0.094$), reflecting feasibility-level variability. **(b)** Lactate increased significantly over time ($p<0.001$) and declined during recovery, with no effect of menstrual phase ($p=0.551$) and no time $\times$ phase interaction ($p=0.654$). Data are mean $\pm$ SD.

Key Findings

	Follicular	Luteal	Significance (p-values)
Heartrate (HR)	175 ± 16	173 ± 12	0.590
Rate of Perceived Exertion (RPE)	19 ± 1	18 ± 1	0.037
Respiratory Exchange Ratio (RER)	1.12 ± 0.03	1.11 ± 0.03	0.738
Ventilation (VE)	80 ± 23	81 ± 21	0.553
Breathing Frequency (BF)	53 ± 9	55 ± 7	0.135
Oxygen Uptake (VO ₂ L/min)	1.97 ± 0.4	1.80 ± 0.5	0.026
Relative Oxygen Uptake (VO ₂ ml/kg/min)	34 ± 7	30 ± 8	0.029
Maximal power output (Watts)	167 ± 35	161 ± 39	0.534

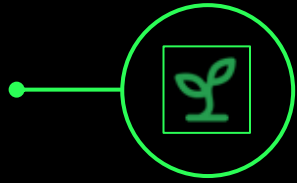
Table 2: Exercise performance variables in the follicular and luteal phases. RPE was slightly lower in the luteal phase (p=0.037). VO₂ (L/min and mL/kg/min) was significantly reduced in the luteal phase (p=0.026 and p=0.029). No differences were observed in HR, RER, VE, BF, or maximal power output. Data are mean ± SD.

Sensory Perceptions of inulin-enriched vs. placebo biscuits: feasibility study & INSIGHT trial updates

Manpreet Kaur Mujral & Dr Lewis Mattin

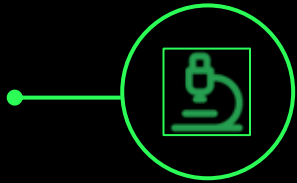
Dr Rummy Begum Prof Mohammed Gulrez Zariwala Dr Ayazullah Safi

Introduction



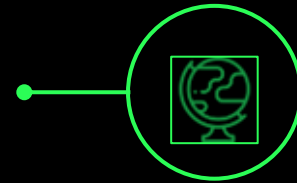
What is Inulin?

Inulin is a type of soluble fiber found in many plants. It serves as a prebiotic, shown to have a bifidogenic effect (Carlson et al., 2018).



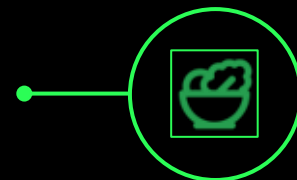
Clinical Trial Relevance

Palatability directly impacts compliance and acceptance; clinical trials depend heavily on adherence. (Lester et al., 2022)



Assessment of Sensory Characteristics

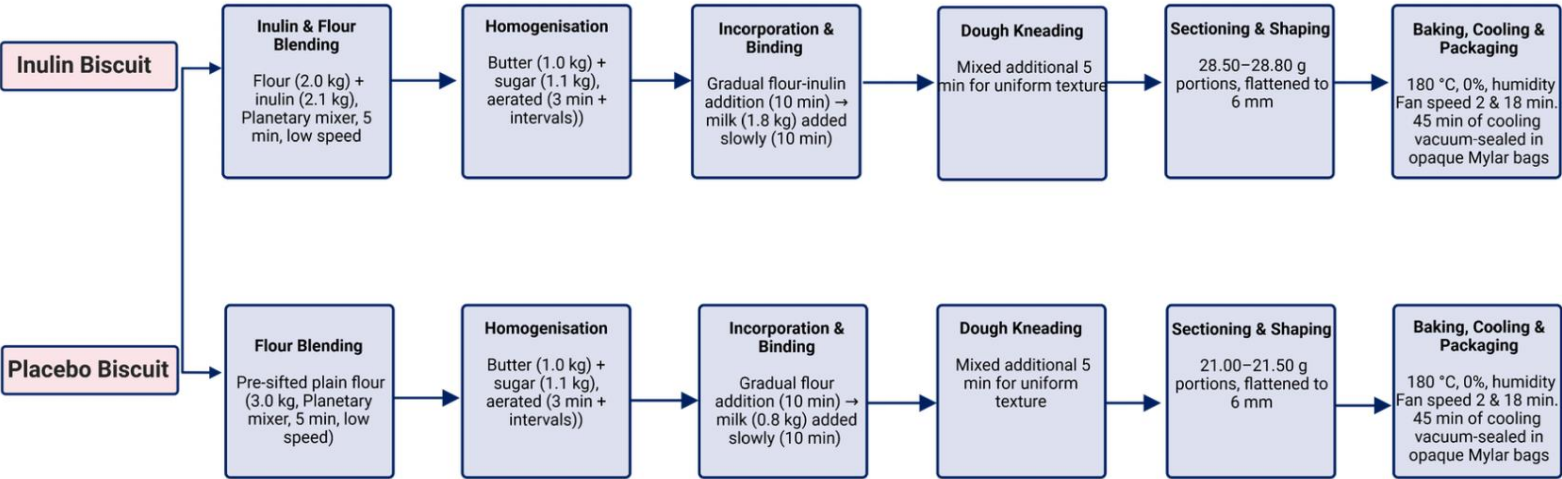
The 9-Point Hedonic Scale is used as a standard method for sensory evaluation. It measures an individual's preference of a food based on five different attributes.



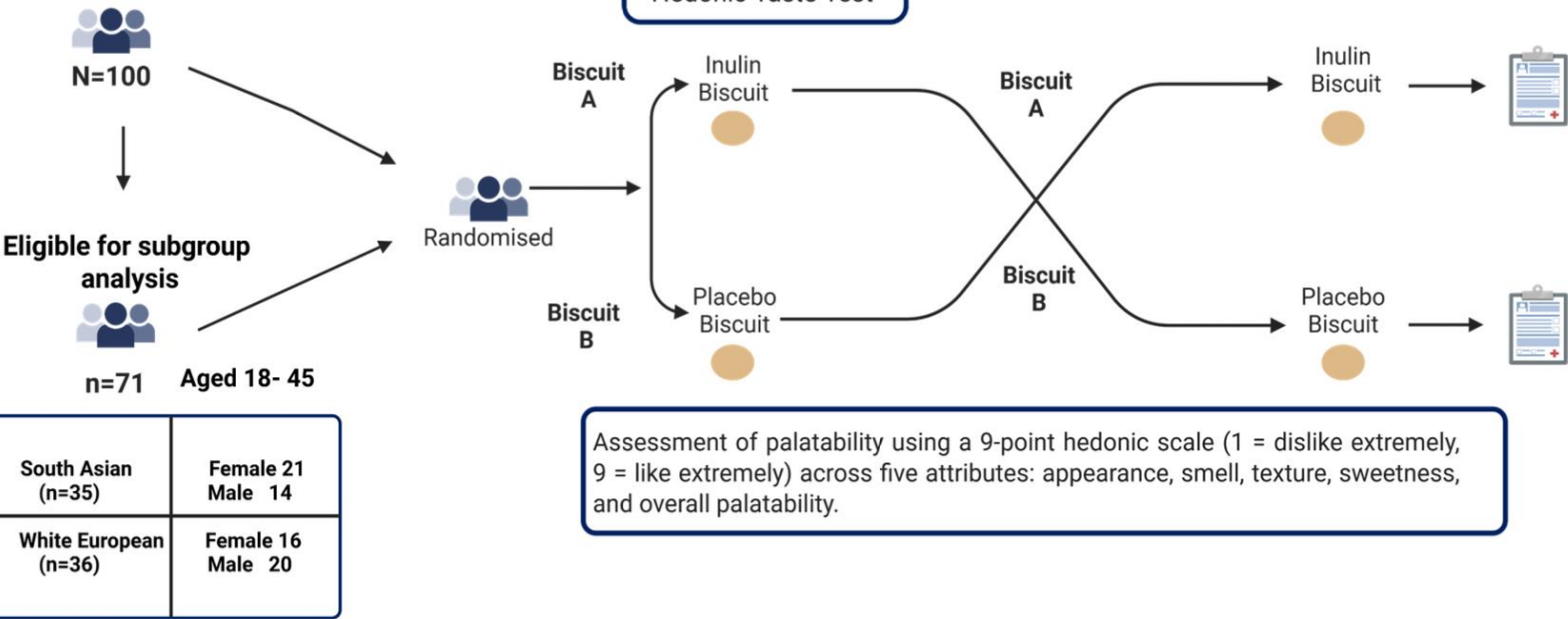
Importance

The UK population consume below the dietary fibre recommendation of 30 g/d; average intake is currently at 19.7g/d (The National Diet and Nutrition Survey).

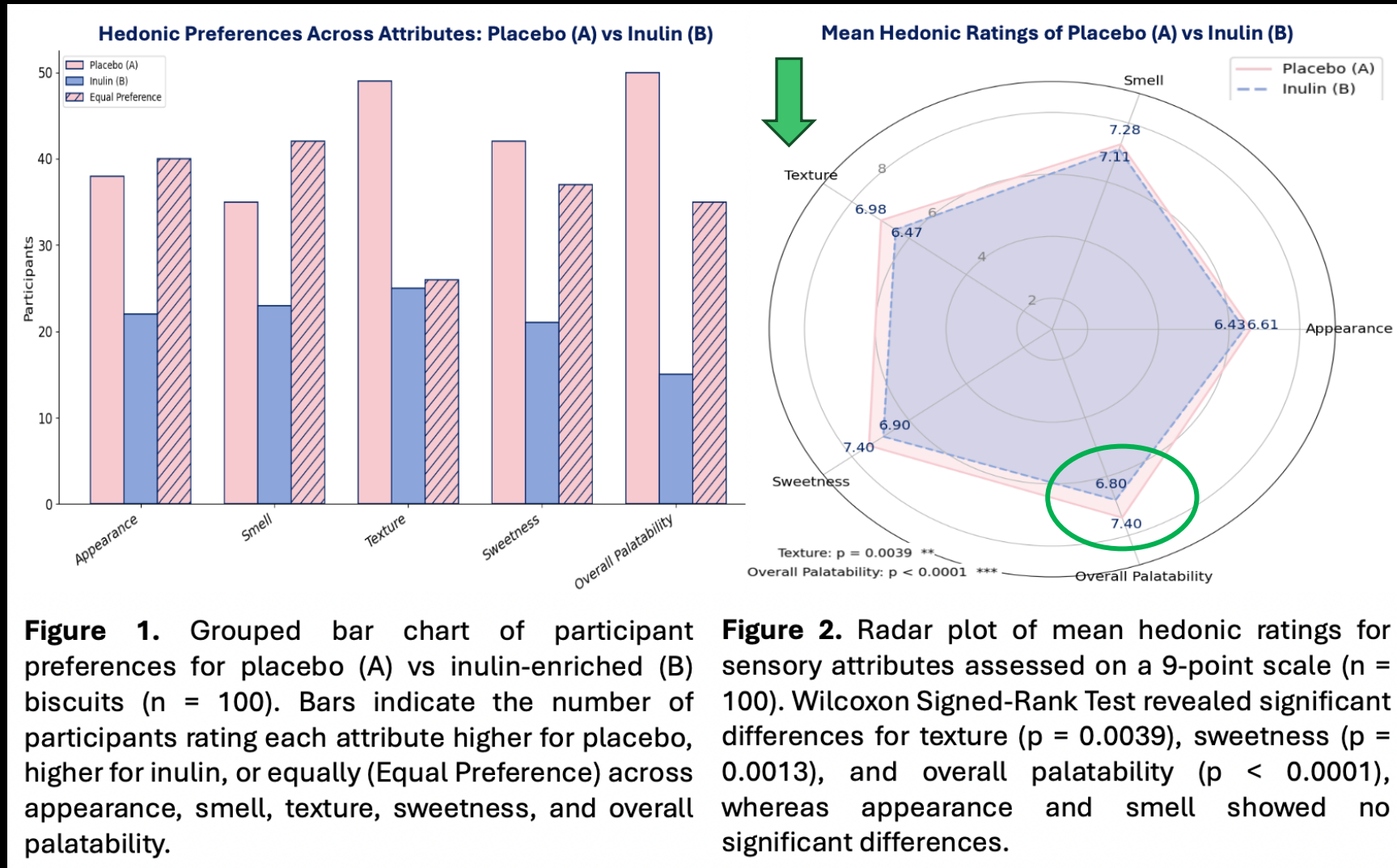
Biscuit Production Methodology



Assessed / Participated

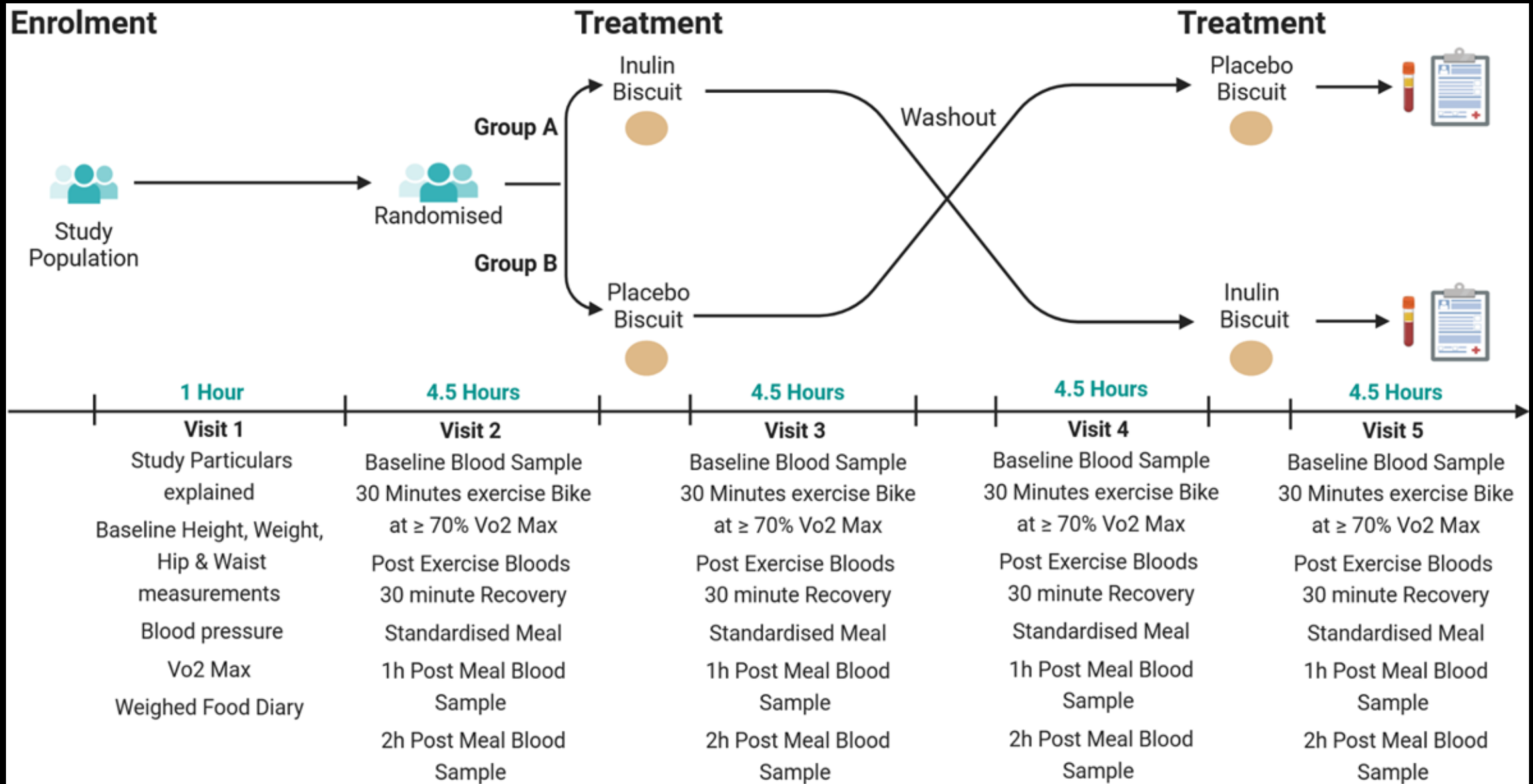


Key Results



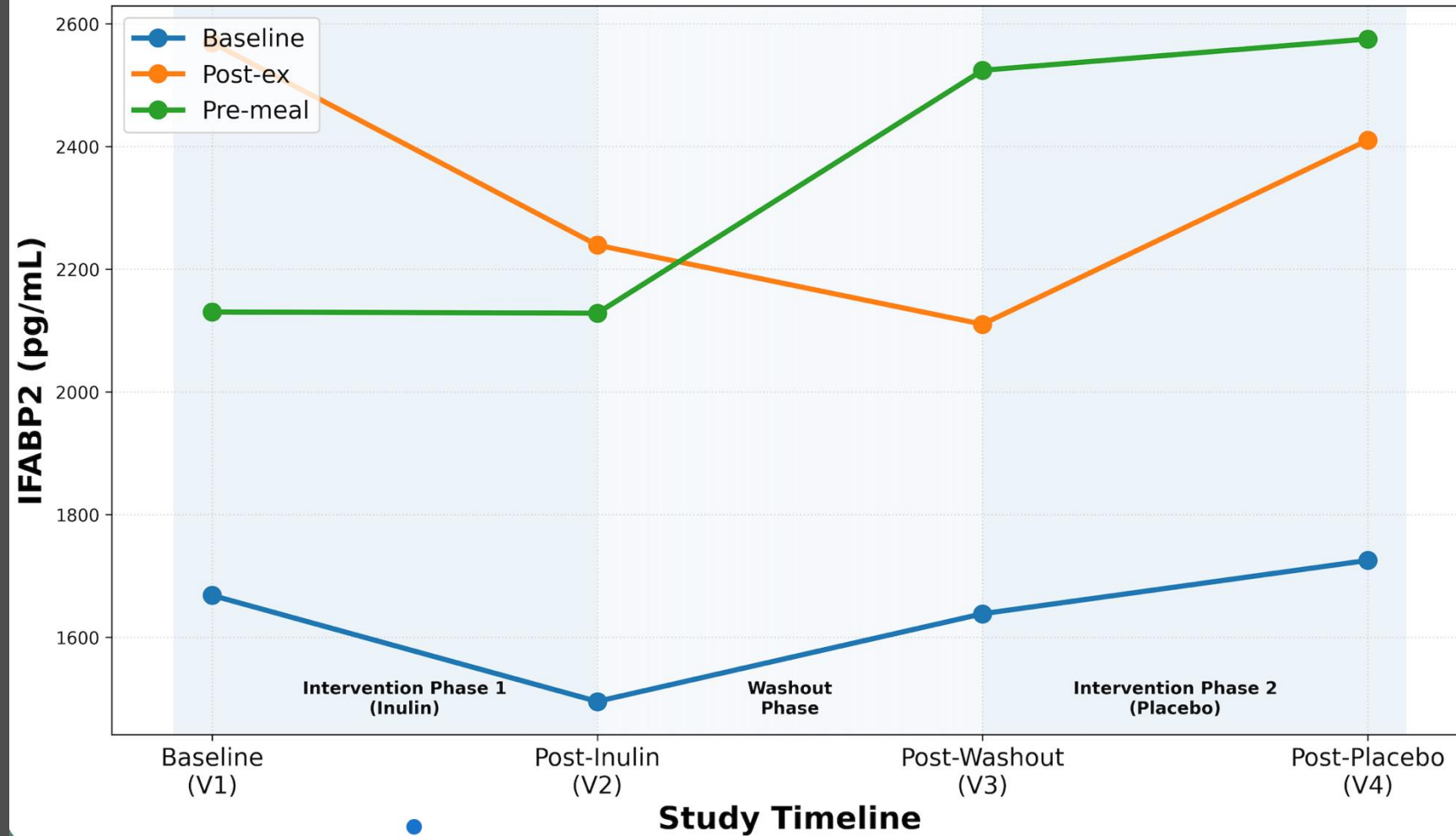
Biscuit A (Placebo) - Mean Overall Palatability = 7.34 ± 1.43 . Biscuit B (Inulin-Enhanced) Mean Overall Palatability = 6.72 ± 1.68 . Both biscuits generally well-liked, > 7 average on hedonic scale

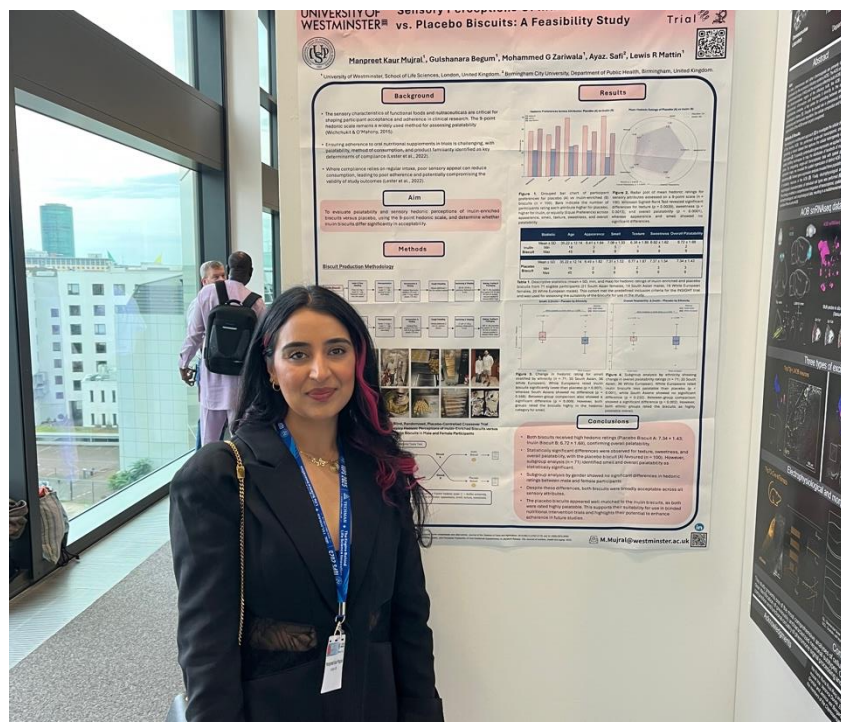
A randomized, double-blind, placebo-controlled, crossover trial investigating the effect of inulin supplementation in South Asian and participants consuming a Western diet.



<u>Biomarkers</u>	<u>Questionnaires</u>	<u>Anthropometric</u>	<u>Dietary</u>
BDNF	Appetite Visual Analogue scale	Blood Pressure	Easy Diet score
CRP	State-Trait Anxiety Inventory (STAI)	Waist-hip ratio	24h Dietary recall x 3
IFABP2	Positive and Negative Affect Schedule (PANAS-SF)	Height	Food Frequency Questionnaire
Zonulin	Menstrual Cycle	Weight	
Serotonin		BMI	
ALT		BIA	
GGT		VO2 Max	
Glucose		Substrate Oxidation	
Triglycerides			
GLP-1			
Insulin			
SCFA			
Stool Samples			

P1-6 Group IFABP2 Responses Across Study Phases

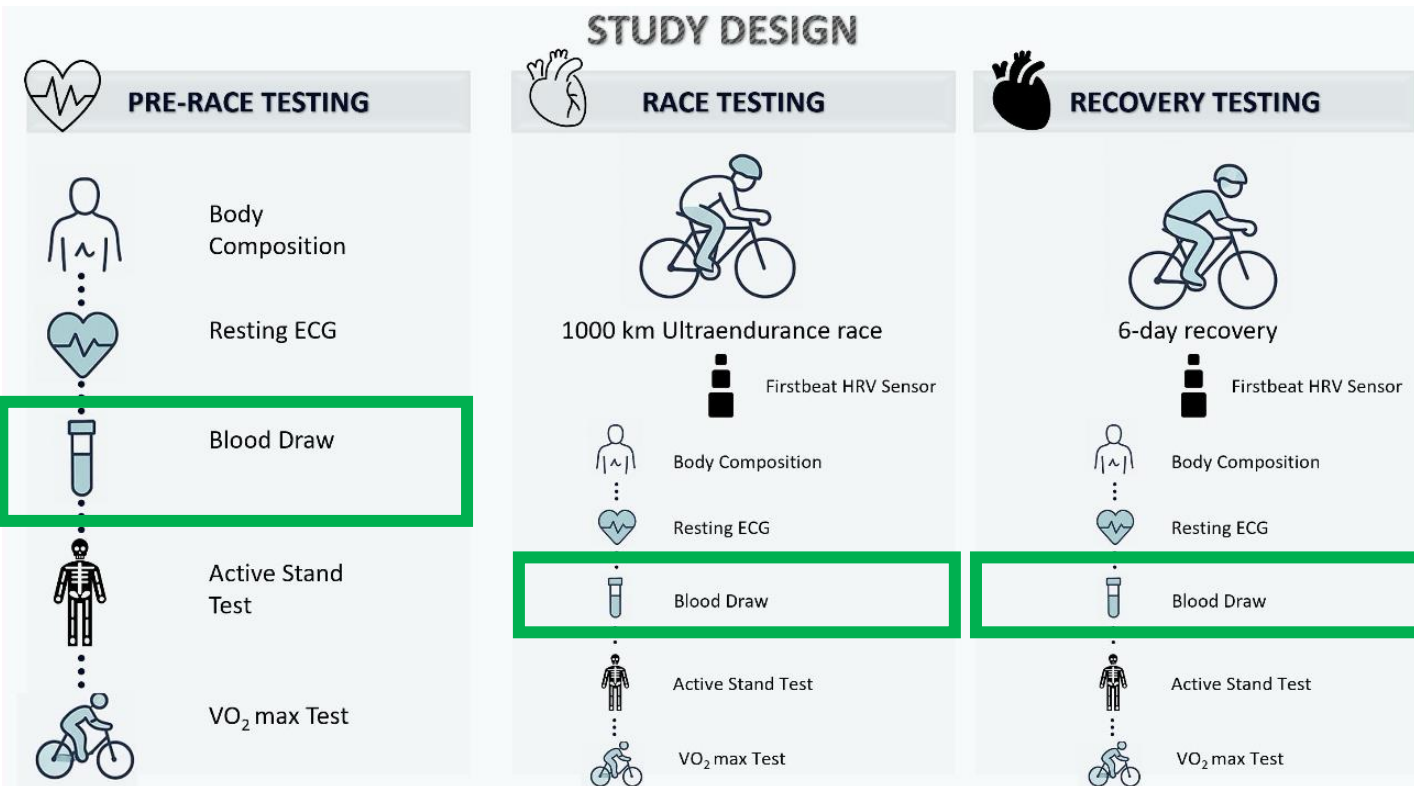




Attenuated maximum heart rate following ultra endurance cycling and the role of the autonomic nervous system: An exploratory study.

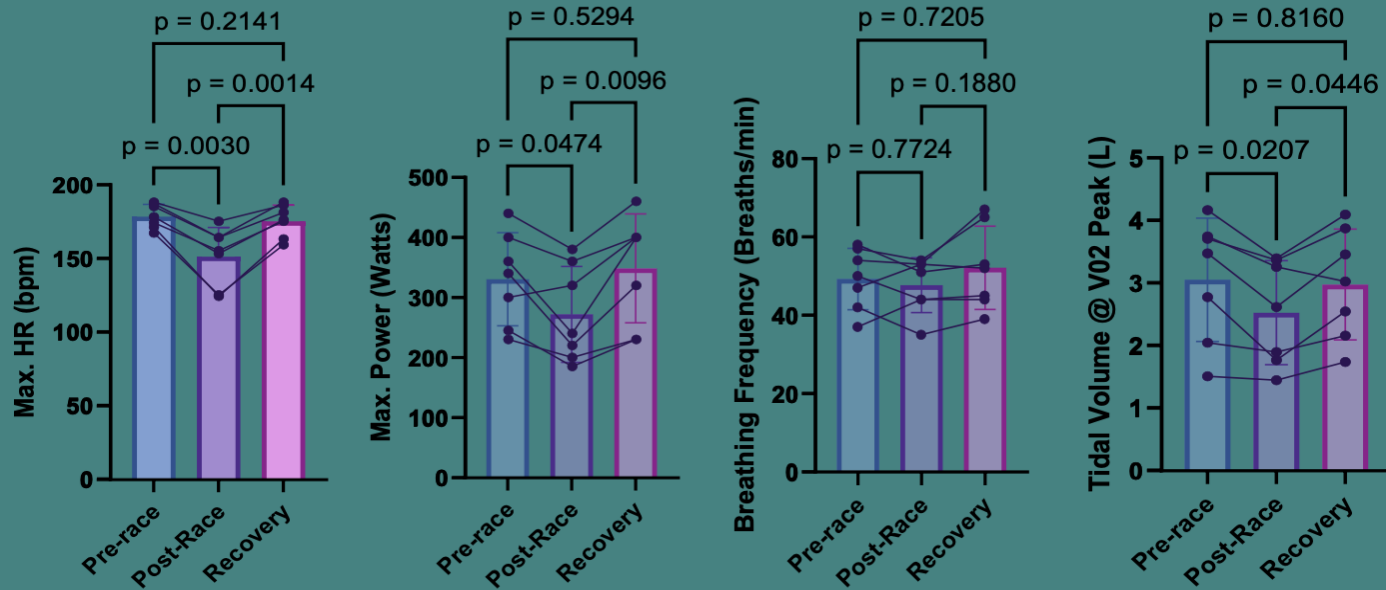
Success Ajayi¹, Lewis Mattin¹, David Gaze¹, Daniel Brayson¹

¹School of Life Sciences, University of Westminster, London, UK

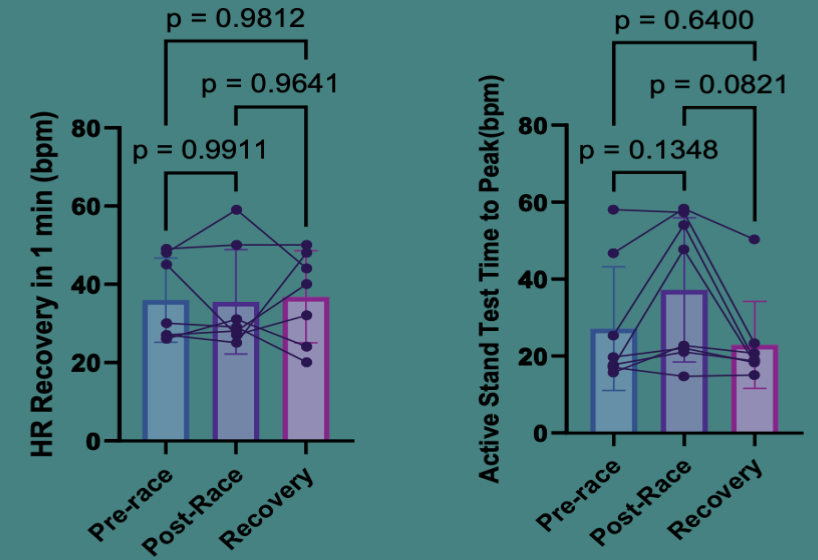


Variable	Total (n=10)
Sex (Male/Female)	8 / 2
Age (years)	47.6 ± 8.3
Height (cm)	177.5 ± 8.5
Weight (kg)	74.8 ± 11.7

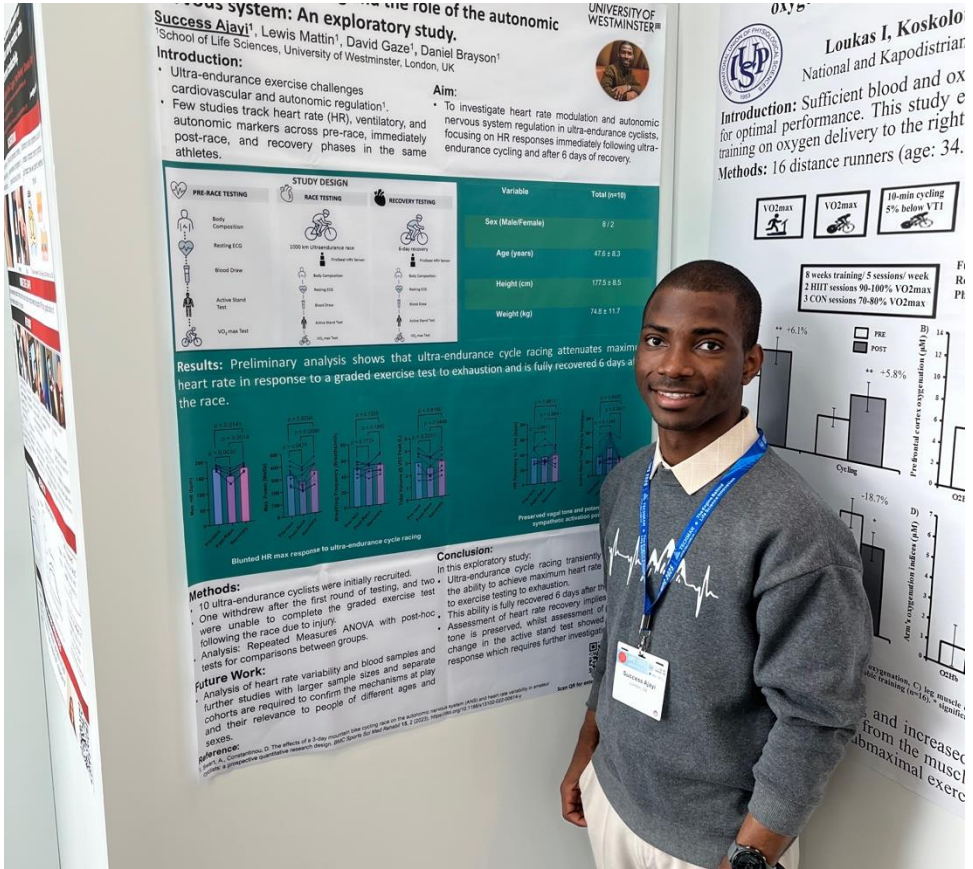
Results: Preliminary analysis shows that ultra-endurance cycle racing attenuates maximum heart rate in response to a graded exercise test to exhaustion and is fully recovered 6 days after the race.



Blunted HR max response to ultra-endurance cycle racing



Preserved vagal tone and potentially slower sympathetic activation post-race



Thank You
For
Listening



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A bit of outreach never hurt
#Pint2027

