

## Liverpool John Moores University

Title: MECHANISMS OF MUSCLE ADAPTATION  
Status: Definitive  
Code: **7037SPOSCI** (119860)  
Version Start Date: 01-08-2015

Owning School/Faculty: Sport and Exercise Sciences  
Teaching School/Faculty: Sport and Exercise Sciences

Team	Leader
Jatin Burniston	Y
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Sam Shepherd	
Neil Chester	

**Academic Level:** FHEQ7      **Credit Value:** 20.00      **Total Delivered Hours:** 60.00  
**Total Learning Hours:** 200      **Private Study:** 140

### Delivery Options

Course typically offered: Semester 1

Component	Contact Hours
Practical	48.000
Seminar	12.000

**Grading Basis:** 40 %

### Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Report	Lab report	Write up/ report of laboratory practical	30.0	
Essay	Exp design	Written proposal for an experiment	70.0	

### Aims

*Nowadays, cutting-edge research in exercise physiology seeks mechanistic*

*understanding and so relies heavily on molecular techniques. This module is aimed at providing students with the knowledge and practical skills to contribute to this exciting area of research. Work within the Research Institute for Sport and Exercise Sciences pioneered the application of proteomic techniques in exercise physiology, and this module principally provides training in traditional and contemporary protein analysis. The module is delivered through problem-based discussions and laboratory practicals conducted in small groups.*

## **Learning Outcomes**

After completing the module the student should be able to:

- 1 Demonstrate fundamental laboratory competencies, including risk assessment (COSHH), formulating molar solutions and manual pipetting
- 2 Critically appraise literature regarding the signal transduction hypothesis of adaptation
- 3 Construct an experiment employing molecular techniques to test a hypothesis relevant to exercise physiology

## **Learning Outcomes of Assessments**

The assessment item list is assessed via the learning outcomes listed:

Lab report	1	
Experimental design	2	3

## **Outline Syllabus**

*Signal transduction hypothesis of adaptation*  
*Risk assessment (COSHH; control of substances hazardous to health)*  
*Fundamental 'Wet lab' techniques and bench skills*  
*Protein extraction and quantitation*  
*RNA extraction and quantitation*  
*Immunohistochemistry*  
*Protein identification (western blotting/ mass spectrometry)*

## **Learning Activities**

This module is timetabled as either 2 h discussion sessions or 1 day (8 h) laboratory practicals. The discussion sessions employ problem-based learning to develop a working understanding of the signal transduction hypothesis of exercise-induced adaptation. The subsequent practical sessions conducted in the biochemistry laboratory are aimed at providing fundamental 'bench skills', training in sample processing methods and an introduction to key analytical techniques. Each session typically encompasses a lead-lecture, demonstration or discussion covering the essential theoretical underpinnings of the assay followed by practical training and data collection in groups of approximately 4-5 students. A detailed protocol is

provided for each assay, in addition to supervision by academic and technical support staff.

## **Notes**

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