

Liverpool John Moores University

Title: Molecular Nutrition
Status: Definitive
Code: **6003SPS** (129023)
Version Start Date: 01-08-2021

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

| Team | Leader |
|-------------------|--------|
| Abdulmannan Fadel | Y |
| Ian Davies | |

Academic Level: FHEQ6
Credit Value: 20
Total Delivered Hours: 42
Total Learning Hours: 200
Private Study: 158

Delivery Options

Course typically offered: Semester 2

| Component | Contact Hours |
|-----------|---------------|
| Lecture | 20 |
| Practical | 10 |
| Workshop | 10 |

Grading Basis: 40 %

Assessment Details

| Category | Short Description | Description | Weighting (%) | Exam Duration |
|----------|-------------------|-------------------|---------------|---------------|
| Essay | AS1 | Essay (2500-word) | 60 | |
| Exam | AS2 | Exam (2-hour) | 40 | 2 |

Aims

The module builds upon previous biochemistry and physiology modules, providing an in-depth exploration of the expanding field of molecular nutrition. Contemporary researching is rapidly expanding our knowledge of how various dietary bioactive compounds can modulate biochemical systems, and how this can be regulated at the level of the gene. Furthermore, progress in analytical techniques now allow the

analysis of myriad molecules from one sample (e.g. plasma) that can provide molecular fingerprints, which are important for advances in precision and personalised nutrition. The module aims to introduce and explore these concepts, with a critical eye, with the use of clinical and preventive health examples.

Learning Outcomes

After completing the module the student should be able to:

- 1 Critically evaluate the core concepts of nutrients as metabolic modulators.
- 2 Discuss the clinical role of nutrigenomics and nutrigenetics.
- 3 Discuss the use of Omics technology in advancement of precision (personalised) nutrition.

Learning Outcomes of Assessments

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

| | | |
|-------------------|---|---|
| Essay (2500-word) | 2 | 3 |
| Exam (2-hour) | 1 | |

Outline Syllabus

Nutrition and Cell Biology:

Molecules of the cells; Cell membranes and enzymes; cellular mechanisms in relation to Nutrition and Exercise; Nutrigenetics and Nutrigenomics.

Nutrition and Metabolic dysregulation:

The role of food bioactive compounds in inflammatory disease; Nutritional and Exercise strategies for obesity, metabolic syndrome and diabetes; Nutritional and Exercise strategies for cancer; The role of nutrition and exercise in gut health.

Personalised/precision nutrition:

Dietary treatment for inherited conditions/diseases; Role of food bioactive compounds in gene expression; Effects of dietary manipulation on genotypes (epigenetics); Future nutrition challenges using Omics technology; Use of microbiome as a predictor of metabolic disease.

Learning Activities

Lectures, workshops, and practical sessions will be the main form of student learning activities. The use of Canvas using online laboratory skill software (to aid live practical classes), quizzes, and problem solving will provide a blended learning approach. Students will work collaboratively (e.g. workshop sessions) with early formative and summative feedback.

Notes

The Association for Nutrition (AfN) competencies covered in this module include:

CC1a The human/ animal body and its functions, especially digestion, absorption, excretion, respiration, fluid and electrolyte balance, cardiovascular, neuro-endocrine, musculoskeletal and haematological systems, immunity and thermoregulation, energy balance and physical activity

CC1b Mechanisms for the integration of metabolism, at molecular, cellular and whole-body levels for either human or animal systems.

CC1e How nutrients are used by the body (either human or animal) consequences of deficiency and assessment of nutritional status.

CC1h Digestion, absorption, transportation and storage of nutrients and non-nutrient components of foods or feeds for either human or animal systems.

CC1n Ability to obtain, record, collate, analyse, interpret and report nutrition-related data using appropriate qualitative and quantitative research and statistical methods in the field and/or laboratory and/or intervention studies, working individually or in a group, as is most appropriate for the discipline under study.

CC1o Prepare, process, interpret and present data, using appropriate qualitative and quantitative techniques, statistical programmes, spreadsheets and programs for presenting data visually.

CC1i Nutrition in health and disease, consequences of an unbalanced diet for either human or animal systems.

CC4c Scientific basis of the safety and health promoting properties of nutrients and nonnutrient components of food or feed, based on knowledge of the metabolic effects of nutrients, anti-nutrients, toxicants, additives, pharmacologically active agents (drugs); nutrient-nutrient interactions, nutrient-gene interactions, 'nutraceuticals', functional foods, and any other metabolically active constituents of foods or feeds and the diet.