



LEVEL 4

SEMESTER 2

MODULE CODE: SHSS4068

MODULE TITLE: THE SCIENCE OF NUTRITION

ASSESSMENT TYPE: ESSAY

ASSESSMENT/COMPONENT: 1

COMPONENT WEIGHTING: 100 %

WORD COUNT: 3000

MODULE TUTOR: David Gardner

SUBMISSION DETAILS: by 3.00 pm through turnitin

- Complete all 3 essays to be submitted through Turnitin UK via moodle.
- Each essay to be no more than 1000 words, excluding figures, tables and references.

By 28th February 2020

Describe the hormonal and enzyme regulation of the digestion process.

or

Describe the digestive process with particular reference to gut flora and bioavailability.

By 27th March 2020

Describe the mechanisms of cell signalling.

or

Describe the processes of gene expression.

By 1st May 2020

Describe the roles and importance of vitamins or minerals during energy catabolism.

or

With reference to a specific vitamin or mineral discuss the implications of deficiency and toxicity.

Assessment Criteria

Details relating to the specific requirements levels grading for the essays are provided in the generic level descriptor provided on moodle.

Specific details and an example session will be provided during lectures.

School of Sport, Health & Outdoor Education

Assessment Feedback Sheet

Student No./Name:

Module Code: SHSS4068

Module: The Science of Nutrition

Personal Evaluation – to support your academic progress please complete the section below BEFORE submitting your work.									
What do you consider to be the best aspects of this work?		The amount of research that has gone into the writing and the quality of the references.							
Which aspects do you consider could have been improved in this piece of work?		Potentially the structure/organisation of the assignment. For whatever reason I found it hard to put the paragraphs in the right order for this one.							
What have you found most satisfying whilst undertaking this submission?		I chose this title in the first place because I felt I knew less about this topic than the other options I could've taken. So I have taken satisfaction in learning more about a topic I wasn't confident in and expanding my knowledge.							
ASSESSMENT CRITERIA	Learning Outcome	GRADE							
		Poor 0-25%	Unsatisfactory 26-39%	Satisfactory 40 – 49%	Good 50 – 59%	Very Good 60 – 69%	Excellent 70 – 85%	Exceptional 86– 100%	%
Theoretical explanation	1								70%
Use and appropriateness of references	2								20%
Structure and flow of answer	1								10%
It is expected that students will present work that is proof read, correctly referenced and adheres to the Assessment Checklist . Therefore a range of 0 – 10 marks will be deducted for non-completion of any of the points on the checklist below .									
TUTOR COMMENTS:									
Submission date: via Turnitin		Return date: (at least within 4 weeks)		Tutor:			Mark:		

Assignment Checklist

- ✓ Please complete the **Personal Evaluation** section of the Assessment Feedback sheet, add your name and details, and paste the whole of this assignment document into the front of your assignment
- ✓ Submission is a **single .pdf file, clearly labelled** with your name and module code
- ✓ Font style - Times New Roman, size -12 for text and 14 for headings
- ✓ Ink colour – black only
- ✓ Line spacing – 1.5 line spacing and 2cm- 2.5cm page margins
- ✓ Quotations more than three lines to be indented 1 line spacing
- ✓ One line space between paragraphs, paragraphs must be left aligned
- ✓ Pagination (your assignment should have **page numbers**)
- ✓ All tables and figures are internally referenced and have a title
- ✓ **Word count** checked and written at end of text (before references and any appendix)
- ✓ Assignment is within 10% of the word limit (excluding references and any appendices)
- ✓ **All** references in the text are included in the reference list
- ✓ **Correct referencing as described in UWTSD Harvard Referencing Handbook on the Library website** <https://www.uwtsd.ac.uk/media/uwtsd-website/content-assets/documents/library-and-learning-resources/infoskills/harvard-eng.PDF>
- ✓ Correct spelling and punctuation, using **UK English**
- ✓ Grammar and syntax correct- double check anything that has a green line under it
- ✓ I have read my assignment out loud to myself and it makes sense and is easy to read
- ✓ Somebody else has read my work and it makes sense to him or her!
- ✓ **I have checked and I have not plagiarised**
- ✓ **Failure to follow these guidelines will cost you marks**

Involvement of gut Flora Within the Digestive Process and Consequences of Dysfunction

Gut flora, also known as gut microbiota, consists of a population of microorganisms that are located in the gastrointestinal tract and are essential for the maintenance of optimal gut health (Thursby and Juge, 2017). The focus on gut flora, for the purposes of nutrition, became more popular after the year 2000 as new technology allowed people to explore and develop a better understanding of the role of gut flora within the body and how it functions (Wallace et al. 2012). Everyone has unique gut flora but it always has the same functions and impact on one's health, its key functions are helping to digest food in the stomach and small intestine, helping in the production of vitamin B and K, maintaining gut health, helping to maintain a healthy immune system and maintaining optimal digestive functioning (Gut Microbiota for Health, 2019). Calder (2013) stated that 'A well-functioning immune system is key to providing good defence against pathogenic organisms'. It is therefore important for one to maintain good gut flora so that one's immune system continues to protect them from a variety of pathogens along with properly maintaining all of the functions of the gut flora.

Standard, healthy gut flora has two important bacteria that make up the majority of the bacteria in the gut, Bacteroidetes which produce short-chain fatty acids and extract some energy from food and Firmicutes which extract lots of energy from food (Lloyd-Price et al. 2016). Bibbò et al. (2016) found that Bacteroidetes are associated with high fat and low fibre diets whereas Firmicutes are associated with low fat and high fibre diets and therefore a healthy balance of the two are needed in order to maintain a healthy gut biome. Good and bad changes to gut flora are heavily impacted by one's diet, shown by a study that monitored what children were eating in different areas of the world then comparing those children's gut health and any diseases they might have in connection with poor gut flora (Bibbò et al. 2016). It was also shown that good or poor gut health is not just determined and influenced by diet but also by genetic and environmental factors within one's everyday life (Bibbò et al. 2016).

The gut and gut flora is a vital part of the digestive process, there have been connections found between poor gut health and various diseases such as inflammatory bowel disease and obesity (Alonso and Guarner, 2013). For example, Aron-Wisnewsky et al. (2012, p.590-598) suggests that as gut flora has an important role in energy storage and is subsequently involved in the development of obesity as well as also suggesting that weight loss could affect the gut flora composition. Problems with gut flora can also stem from the prenatal and postnatal developmental periods when the gut flora is shared between the mother and the unborn child (Blanton et al. 2016). Blanton et al. (2016) found that poor gut flora transmitted from undernourished infants into "recently weaned germ-free mice fed a macro- and micronutrient-deficient diet representative of those consumed by the human donors" reduced the lean body mass, had alterations to bone density, impaired muscle development and impaired the brain function of said mice. This suggests that poor gut flora not only affects diseases associated with the gut, such as obesity, but can also affect bone and muscle development as well.

The large intestine is another area in which diseases can occur due to poor gut flora (Flint, 2011). It was stated that gut microorganisms can increase body weight and the volume of fat in fat stores, one way of doing this is by fermenting indigestible components in the diet (Flint, 2011). However, Flint (2011) mentions that there are conflicting studies that have concern as to how the gut flora differs within obese and nonobese people.

There are various functions performed by gut flora and it situates within multiple areas within the body, one of the most important areas being the small intestine. The gut flora in the small intestine maintains dietary fat absorption and digestion through a multitude of processes (Martinez-Guryn et al. 2018). Small bowel microorganisms regulate gut processes that are involved in digestion and the absorption of minerals as well as fat absorption from food (Martinez-Guryn et al. 2018). Round and Mazmanian (2009) state that in order to maintain good intestinal health the pro and anti-inflammatory pathways need to be balanced, if they become imbalanced then it could lead to diseases such as inflammatory bowel disease. This disease is caused by a poor immune response to gut flora and can lead to symptoms such as gut irritation or diarrhoea (Nitzan et al. 2016). However, they also stated that inflammatory bowel disease can be brought on by genetic factors and dietary factors alike, therefore, the gut flora is not the only reason for intestinal diseases but it is a main cause (Round and Mazmanian, 2009).

Considering all the evidence gut flora is a vital part of the digestive process as it aids in the absorption of dietary fats and converts them into energy, it maintains gut health, a healthy immune system and proper digestive functioning. However, there are many consequences of dysfunction due to poor gut health and gut flora. These range from diseases easily connected to the gut, obesity for example, and diseases that are less obviously connected such as bone diseases and muscle diseases. As gut flora has a large impact on one's health and the digestion process, it is important to maintain proper gut health through diet and environmental factors.

Word Count: 919

Reference List

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- Wallace, T. C., Guarner, F., Madsen, K., Cabana, M. D., Gibson, G., Hentges, E., Sanders, M. E. (2011) 'Human gut microbiota and its relationship to health and disease', *Nutrition Reviews*. 69 (7), pp392-403.