



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: Mohammed Amir Uddin

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?	Understanding the topic and displaying the information with the correct research								
Which aspects do you consider could have been improved in this piece of work?	The clarity of the information								
What have you found most satisfying whilst undertaking this submission?	Learning and increasing my understanding of the topic.								
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!**

Implications of deficiency and toxicity with Vitamin C

Vitamins are essential nutrients in the body that aid the in the functioning of the immune system the biological and psychological system in the body and aid in the regulation of homeostasis hence the deficiency of the vitamins allow infections, allergic and inflammatory diseases (Hosomi and Kunisawa, 2017). Vitamin C (VC) is vital for the human body as it protects and keeps living cells healthy while also maintaining healthy skin, blood vessels, bones and cartilage (Vitamin C, 2017). Human beings are unable to synthesise VC hence we must consume it through dietary supplementation (Office of Dietary Supplements - Vitamin C, 2020). This essay will focus on how VC effects humans through deficiency and toxicity and the outcome that occurs due to these factors.

VC's best-defined function is as a cofactor for the enzyme required in hydroxylation of proline and lysine in collagen formation, it can be synthesised by many mammals but not by humans (Commodities, 1997). The properties of VC are that it is a natural water-soluble vitamin, potent reducing and antioxidant agent that functions in fighting bacterial infections and detoxifying reactions (Ascorbic acid, 2020). For adults the recommended VC intake is between 65mg to 90mg a day and the upper limit is 2000mg a day (Zeratsky, 2020). There are many natural sources of VC that can be consumed to replenish VC daily requirements, they can be found in foods such as:

Fruits with the highest source of VC include:

- Citrus fruits and juices
- Mango
- Papaya
- Pineapple
- Strawberries

Vegetables with the highest source of VC include:

- Broccoli, brussels sprouts, and cauliflower
- Green and red peppers
- Spinach, cabbage, turnip greens, and other leafy green

These are examples of the highest sources of VC found in foods (C, 2020).

While VC is found in variety of foods and is very accessible there are people that still lack the required amounts of VC through malnutrition because of poor access to right foods and living in poverty (Sheetal, 2013). This is where VC deficiency occurs through malnutrition the body is not receiving enough VC to aid with the functions in the human body and diseases like scurvy occur, scurvy is a disease that comes from the deficiency of VC causing haemorrhages in organs and bone formation being altered bones become brittle it also starts to cause anorexia and poor wound healing also with the loss of teeth (Maxfield and Crane, 2020). VC deficiency has a major effect on brain development in premature infants without the adequate amount of VC the brain does not develop how it should and in effect results in learning and cognitive disabilities, research has also shown that because of deficiency extensive neuronal damages occur, in the brain the conversion of dopamine to norepinephrine catalysed by VC is impaired resulting in increased concentration of dopamine this can normally be removed by VC which works as an antioxidant but in the case of deficiency the defence does not function hence prevention of neurotoxicity doesn't occur (Tveden-Nyborg and Lykkesfeldt, 2009). A study shows that advanced cancer patients were very commonly associated with VC deficiency and the most important factors determining these VC levels was based on the dietary intake, patients with a lower plasma VC were shown to have reduced survival rate than patients with a higher rate of plasma VC this study indicates the importance of VC in the survival of patients with chronic diseases like cancer (Mayland, Bennett and Allan, 2005). VC Is essential for the structural and functional integrity of androgen-dependent reproductive organs, low levels of VC showed degenerative changes in the testes and plasma testosterone levels also showed a decline on the other hand excessive intake of VC showed reproductive failure in the males, deficiency of VC in may lead to an increase in oxidative damage induced by reactive oxygen species in this was observed in men which were infertile (Chambial et al., 2013).

VC toxicity is not widely understood but the occasional overdose of VC can cause stomach cramps, nausea, diarrhoea but have no long term effect, several mechanisms prevent high concentrations of VC in blood plasma like excess being excreted in the faeces, the second line of defence is the kidneys where they also excrete excess amounts and the third is that food doesn't really contain high amounts of VC. Mega doses of VC increase the formation of renal stones inhibiting the reabsorption of uric acid they enhance the destruction of Vitamin b12 increase the absorption of non-haem iron leading to overload resulting in mutations that

would cause VC catabolism to persist after returning to lower intakes of the vitamin (Scurvy and its Prevention and Control in Major Emergencies: Recommended Daily Allowance (RDA): Hypervitaminosis/vitamin C toxicity, 1999). There are many implications when It comes to VC toxicity this include:

- Muscle weakness
- Muscle, joint, or bone pain
- Yellow-orange tint to the skin
- Sensitivity to the sun
- Itching or rash
- Headaches
- Fatigue
- Mental or mood changes
- Rapid or irregular heartbeat
- Eye irritation or sensitivity to light

These are some of the minor effects that occur but aren't very long term, but the major effects are stated above such as renal stones and overloading on non-haem iron (Vitamin Overdose During Pregnancy - American Pregnancy Association, 2020).

To conclude the implications of deficiency and toxicity of VC have a lot of negative effects on the body and need to be taken into consideration when consumed through dietary supplementation. Through a controlled diet it is very easy to maintain a balanced intake of VC because foods don't contain high traces of VC, but compared to taking excess supplementation through medication or supermarket vitamins you need to be careful with the dosage that is consumed because if your diet is not maintained and very unhealthy then you may fall into risk of deficiency and the long term effect can cause major distress to the body and the function of the immune system, biological system and psychological system. If intake is too much, then the risk of overdosing on VC has adverse effects on the body to causing great discomfort and eventually leading to major problems such as renal stones and overloading on non-haem iron which can pose potential risks to the body.

References

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