

Karen Oldham

Essay 2

SHSS4068



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: Karen Oldham

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?	Researching the topic very interesting								
Which aspects do you consider could have been improved in this piece of work?	time								
What have you found most satisfying whilst undertaking this submission?	I actually got it in								
ASSESSMENT CRITERIA	Learning	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

xPlease 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

xSubmission is a **single .pdf file, clearly labelled** with your name and module code

xFont style - Times New Roman, size -12 for text and 14 for headings

xInk colour – black only

xLine spacing – 1.5 line spacing and 2cm- 2.5cm page margins

xQuotations more than three lines to be indented 1 line spacing

xOne line space between paragraphs, paragraphs must be left aligned

xPagination (your assignment should have **page numbers**)

xAll tables and figures are internally referenced and have a title

x**Word count** checked and written at end of text (before references and any appendix)

xAssignment is within 10% of the word limit (excluding references and any appendices)

x**All** references in the text are included in the reference list

x**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>

xCorrect spelling and punctuation, using **UK English**

xGrammar and syntax correct- double check anything that has a green line under it

xI have read my assignment out loud to myself and it makes sense and is easy to read

xSomebody else has read my work and it makes sense to him or her!

xI have checked and I have not plagiarised

**Failure to follow these guidelines will
cost you marks!**

Process of gene expression

DNA (Deoxyribonucleic acid) is the 'blueprint of life' (Orphanides; Reinberg, 2002). DNA within the eukaryotic cells imports genetic instruction to all living organism, within cell nucleus. Gene expression is a process of conveying information usually a protein into a useful product. DNA a chemical, consists of double helix structure of two long molecules. consisting of (Ross; Wilson, 2018) two chains which are nucleotides, comprising of components which are sugar, phosphate group and a base. These DNA molecules combine proteins which complete the chromosomes. Instruction within the DNA is found in the bases, there are four of these Adenine (A); Guanine (G); Thymine(T) and Cytosine(C). There is a process of gene expression Transcription and Translation. Transcription takes place within the membrane of the nucleus. translation takes place outside the nucleus in the cytoplasm.

Where there are three stages are quite complex in the process. Initiation, elongation, and termination (Sturgeon,2018).

Figure 1 Transcription and Translation

TRANSCRIPTION

(DNA→RNA→Protein) this is the flow of genetic instruction in central molecular biology.

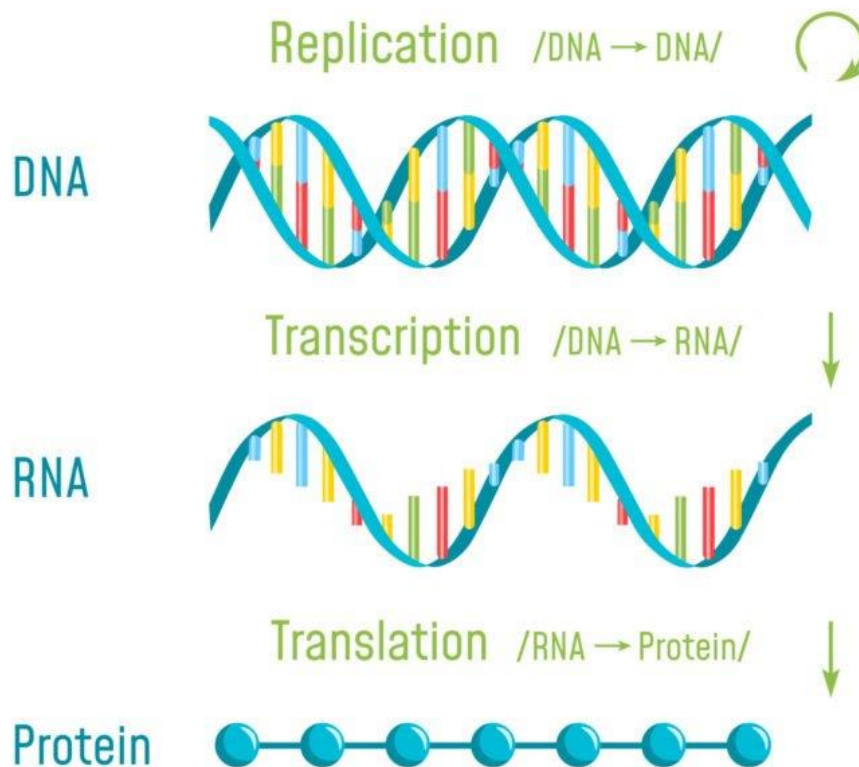


Figure 2 transcription & translation (Cobb, 2018)

Practically all body cells accommodate the human being's genome (McCabe, L et al, 2008). Chromosomal DNA is housed in a membrane bound nucleus, With in every eukaryote cell in Humans. This organism is subdivided into compartments such as subcellular organelles, the nucleus, and (Crick, 1958) DNA gives hereditary instruction which can be used as practical

products, mostly proteins. Gene expression requires two stages transcription is the first stage which forms a replication of a small part of the material that is in the DNA. (Seeley, Stephens and Tate, 2008). In the DNA are four bases

- Adenine (A)
- Guanine (G)
- Thymine(T)
- Cytosine (C)

Adenine will always pair with thymine, whereas cytosine and guanine go together. For example, this genetic code ATCTGACCG would be comparable by UAGACUGGC, meaning always complimentary. There sixty-four permutations in different codon sequences. AUG is the start codon. There are three sites A(aminoacyl), P(polypeptide) and E(exit) where the ribosomes bind to the mRNA. The ribosomes will move by three nucleotides.

Through the middle of the helix they run attached by hydrogen bonds. These along the molecule of the DNA, are base codes which are referred to when going through protein synthesis. This is known as complementary base pairing (Ross & Wilson, 2018). Double stranded is the way DNA (double helix) is made up. One strand is deciphered in this transcription process by complementary pairing, onto a length of RNA, which goes into the cytoplasm and goes to a ribosome, through the nucleus pore. The RNA has a backbone ribose whereas DNA is deoxyribose. Transcribed by an enzyme, RNA Polymerase reads the strand that is complimentary to that part in the gene (Jeraldo, 2006). This is known as initiation in transcription, the RNA attaches to the promoter as in figure 2. Pre-mRNA, which is not transcribed but function in translation. RNA carries protein coded regions; these have areas called exons that code part of the protein and introns that do not code parts of the protein. (Seely, Stephen and Tate, 2008). The intron (non-coding part) will be edited which is called RNA splicing before turning into protein. Posttranscriptional processing first act is to 5' prime (7-methyl guanosine cap) end of the mRNA and a series of adenine nucleotides (poly-A tail) 3'on the other end. The 5' end is upstream (GU) and the 3' end is downstream (AG).

Figure 3FFF

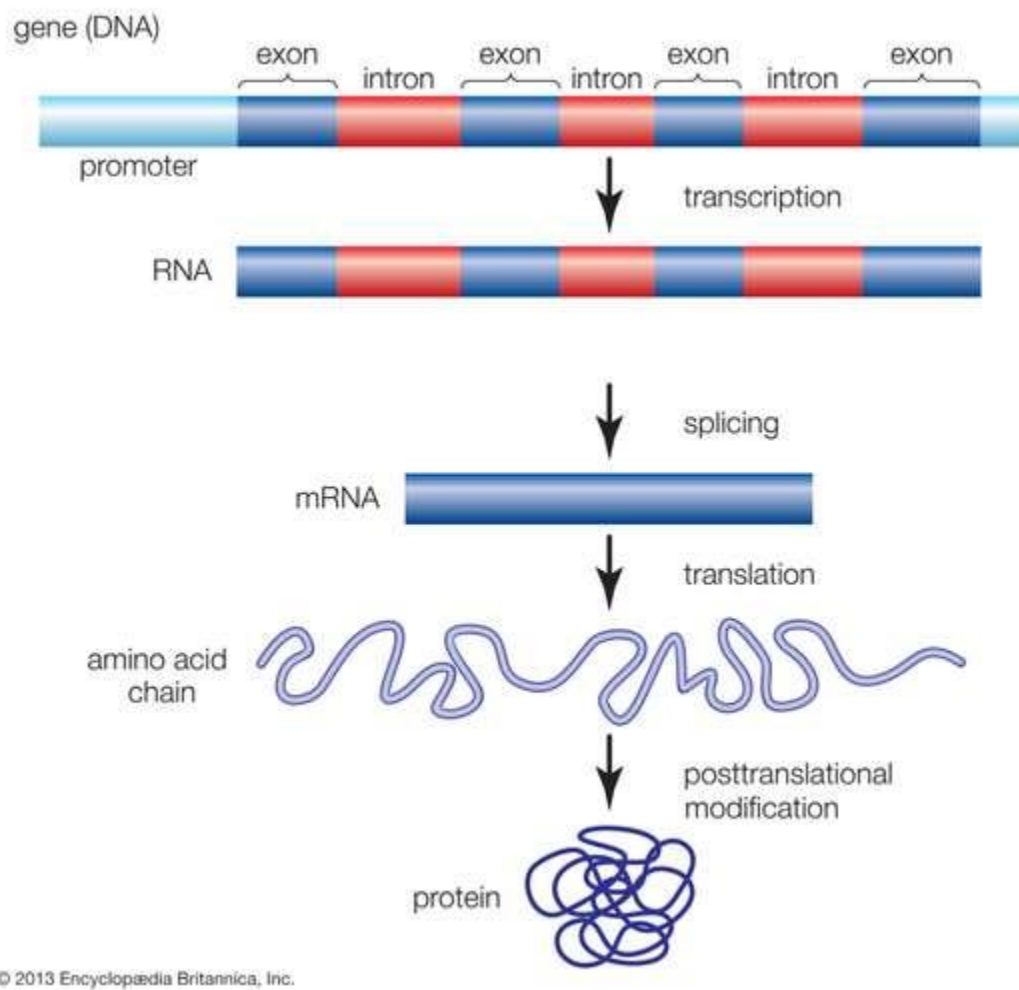


Figure 3 (Britannica, 2018)

RNA will import this advice to messenger RNA (mRNA) to the ribosomes to be rewritten. There are three different types of RNA

- mRNA (messenger RNA)
- tRNA (transfer RNA)
- rRNA (ribosomal RNA)

When the mRNA is being prepared the introns are removed as in figure 3, the exons are then merged forming a cultivated mRNA. (Seeley, Stephen & Tate, 2008) Many different proteins can be produced from RNA splicing. These different RNA'S all do different things.

(Sturgeon, 2018) When the mRNA is completed with the first amino acid the tRNA aligns with the start codon (AUG, codes for methionine) which is a three-letter arrangement of nucleotides. The elongation stages are when the mRNA flow through the ribosome, one at a time. Every time a new codon arrives at the ribosome, tRNA enhances providing a new amino acid into right sequence through the ribosome. This makes the chain longer, the tRNA repeating it many times able to choose and bring more amino acids. The final stage is termination in gene expression when polypeptides or amino acids go into proteins where they are needed. This is done by messenger (mRNA) which is interpreted by the ribosome (stop codon UAA, UAG & UGA). This is where translation ends, the ribosomal subunits (Sturgeon, 2018) mRNA and protein part. The Hydrogen bonds create Amino acids to fold in repetitious pattern, then into its final 3D shape. This then goes on to be conveyed to where it is needed.

Gene expression where DNA (deoxyribonucleic acid) allows saved data to produce a useful protein. This includes a complex process of two steps Transcription and Translation. Genetic knowledge is needed to determine the characteristics of all living things. Transcription, the enzyme RNA polymerase (ribonucleic acid) produces messenger RNA (mRNA). Translation, mRNA is used for making protein synthesis. As the DNA cannot leave the nucleus as it is too large a molecule, it makes a copy or **transcript** by unwinding a strand of its double helix. This then goes through a complex process of translation where the mRNA is translated to assemble a protein, these contain precise amino acids. The termination is the last stage where the polypeptide chain is released, the stop codon enters the ribosome. The polypeptide folds into a 3D pattern where it is carried to the appropriate place. Gene expression allows the cell to react to the changing environment (food, drugs, and toxins) The human body consists of trillions of cells with many functions and parts, gene is expression is just one of them.

References

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Assessed on 13/04/2020

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Assessed on :19/04/2020

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(Assessed on: 19/04/2020)

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(Assessed on 19/04/2020)

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