

See back cover for an English translation of this cover

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91159M



NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

SUPERVISOR'S USE ONLY

Koiora, Kaupae 2, 2012

91159M Te whakaatu māramatanga ki te whakatinana ira

2.00 i te ahiahi Rāpare 22 Whiringa-ā-rangi 2012
Whiwhinga: Whā

Paetae	Paetae Kaiaka	Paetae Kairangi
Te whakaatu māramatanga ki te whakatinana ira.	Te whakaatu māramatanga hōhonu ki te whakatinana ira.	Te whakaatu māramatanga matawhānui ki te whakatinana ira.

Tirohia mehemea e ōrite ana te Tau Ākongā ā-Motu (NSN) kei tō pepa whakauru ki te tau kei runga ake nei.

Me whakautu e koe te KATOĀ o ngā pātai kei roto i te pukapuka nei.

Ki te hiahia koe i ētahi atu wāhi hei tuhituhi whakautu, whakamahia te (ngā) whārangi kei muri i te pukapuka nei ka āta tuhi i te tau pātai.

Tirohia mehemea kei roto nei ngā whārangi 2–15 e raupapa tika ana, ā, kāore hoki he whārangi wātea.

HOATU TE PUKAPUKA NEI KI TE KAIWHAKAHAERE HEI TE MUTUNGA O TE WHAKAMĀTAUTAU.

TAPEKE

MĀ TE KAIMĀKA ANAKE

QUESTION TWO: PROTEIN SYNTHESIS

Part of a sequence of mRNA is shown below.

- (a) Complete the DNA strands by filling in the missing bases, AND identify which strand is the DNA template, by circling the appropriate label.

DNA	{	<u>T</u> <u>A</u> <u>C</u> — — — — — — — — —	Strand 1
		<u>A</u> <u>T</u> <u>G</u> — — — — — — — — —	Strand 2
mRNA		<u>A</u> <u>U</u> <u>G</u> <u>G</u> <u>C</u> <u>A</u> <u>G</u> <u>A</u> <u>U</u> <u>U</u> <u>C</u> <u>U</u>	

- (b) With reference to the table below, explain what is meant by the term 'redundancy due to degeneracy within the code'.

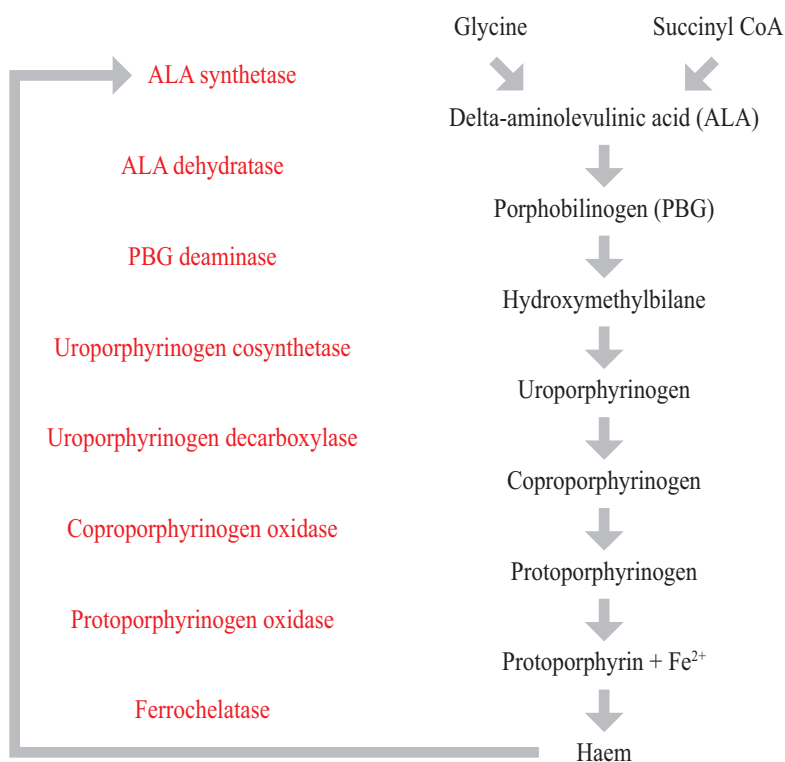
TABLE OF mRNA CODONS

		SECOND CODON ELEMENT					
		U	C	A	G		
FIRST CODON ELEMENT	U	PHE	SER	TYR	CYS	U	
		PHE	SER	TYR	CYS	C	
		LEU	SER	STOP	STOP	A	
		LEU	SER	STOP	TRP	G	
	C	LEU	PRO	HIS	ARG	U	
		LEU	PRO	HIS	ARG	C	
		LEU	PRO	GLU	ARG	A	
		LEU	PRO	GLU	ARG	G	
	A	ILE	THR	ASPN	SER	U	
		ILE	THR	ASPN	SER	C	
		ILE	THR	LYS	ARG	A	
		MET	THR	LYS	ARG	G	
	G	VAL	ALA	ASP	GLY	U	
		VAL	ALA	ASP	GLY	C	
		VAL	ALA	GLU	GLY	A	
		VAL	ALA	GLU	GLY	G	

PĀTAI TUATORU: NGĀ ARA WHAKARAU PŪNGAO

He rōpū mate onge te mate porphyria e heke iho ana i roto i ngā whānau, i kore ai e tika te hanga o tētahi wāhanga hira o te kawehā, e kīia ana ko te haem.

Ko te tikanga, mahia ai e te tinana te haem mā tētahi tukanga upane-maha. Ka hangaia ngā porphyrin i ētahi o ngā upane o tēnei tukanga. Kei ngā tūroro e pāngia ana e te mate porphyria he hohoretanga o ētahi pūmua whākōkī e hihiatia ana mō tēnei tukanga. Ka pupū ake ngā rahinga inati o ngā porphyrin, ngā matū whai pānga rānei i roto i te tinana.



I te hoahoa i runga, he whero ngā pūmua whākōkī.

Matapakitia he aha i rerekē ai pea ngā pūtakenga mate o ngā tūroro e pāngia ana e te mate porphyria, ka whakamārama anō ka pēhea e taea ai e ngā mātua e rua whai mate porphyria te whakawhānau tamariki kāore e whai mate porphyria.

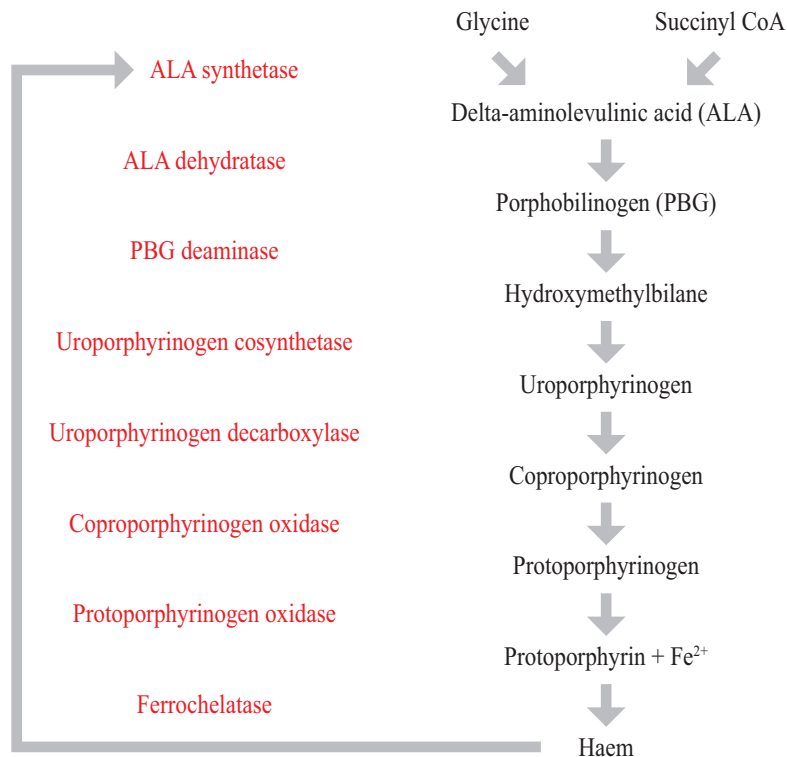
I tō whakautu, me whai whakaaro ki:

- **te whakaahuatanga** o te tikanga o te kupu ‘ara whakarau pūngao’.
- he **whakamāramatanga** he aha i tūhene ai pea ētahi pūmua whākōkī.
- he **arotakenga** o te hoahoa hei **parahau** he aha i taea ai pea ngā pūtakenga rerekē o taua mate, Ā, ka pēhea e whānau ai ētahi tamariki pūnoa i ngā mātua e pāngia ana e tēnei mate.

QUESTION THREE: METABOLIC PATHWAYS

Porphyrias are a group of rare disorders passed down through families, in which an important part of haemoglobin, called haem, is not made properly.

Normally, the body makes haem in a multi-step process. Porphyrins are made during several steps of this process. Patients with porphyria have a deficiency of certain enzymes needed for this process. This causes abnormal amounts of porphyrins or related chemicals to build up in the body.



In the above diagram, the enzymes are shown in red.

Discuss why patients with Porphyria may have different causes of the disorder, and how two parents with Porphyria could give birth to children who do not have it.

In your answer you should consider:

- a **description** of what is meant by the term ‘metabolic pathway’.
- an **explanation** of why some enzymes might be deficient.
- an **evaluation** of the diagram to **justify** how there can be different causes of the disorder, AND how normal children could be born from affected parents.

English translation of the wording on the front cover

Level 2 Biology, 2012

91159 Demonstrate understanding of gene expression

2.00 pm Thursday 22 November 2012

Credits: Four

Achievement	Achievement with Merit	Achievement with Excellence
Demonstrate understanding of gene expression.	Demonstrate in-depth understanding of gene expression.	Demonstrate comprehensive understanding of gene expression.

Check that the National Student Number (NSN) on your admission slip is the same as the number at the top of this page.

You should attempt ALL the questions in this booklet.

If you need more space for any answer, use the page(s) provided at the back of this booklet and clearly number the question.

Check that this booklet has pages 2–15 in the correct order and that none of these pages is blank.

YOU MUST HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION.