

91159



NEW ZEALAND QUALIFICATIONS AUTHORITY  
MANA TOHU MĀTAURANGA O AOTEAROA

2

SUPERVISOR'S USE ONLY

## 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 2–8 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.**

TOTAL

ASSESSOR'S USE ONLY





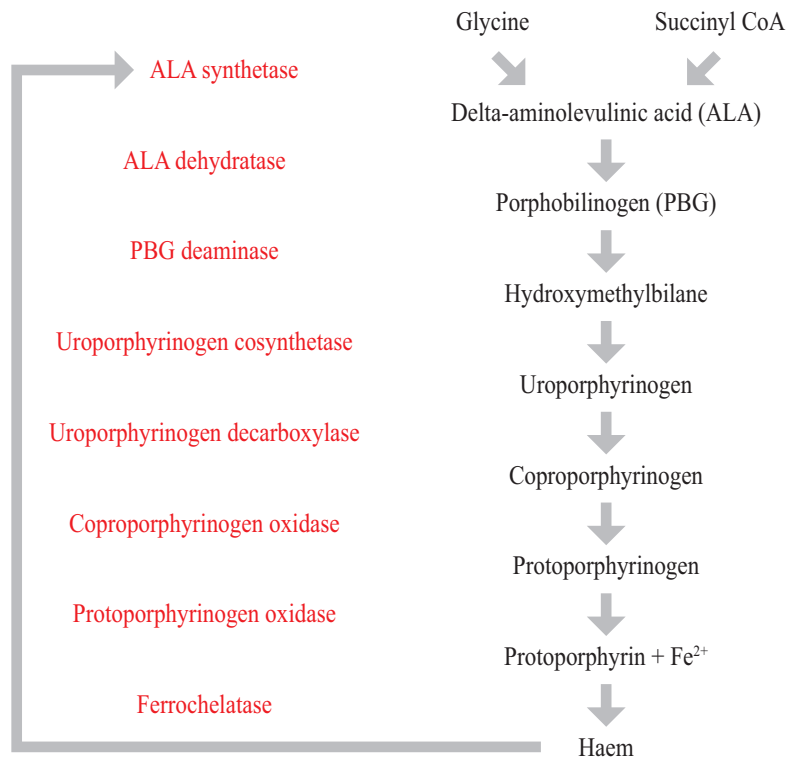




### QUESTION THREE: METABOLIC PATHWAYS

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.

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