

## Post Seminar Challenge Questions

1. Define the term early life nutritional environment means and discuss the potential that this environment has to impact on the health and well being of the individual. In your answer consider the following areas: early puberty; obesity; adult diseases.
2. Define oxidative stress and discuss how nutrition can contribute to minimising oxidative stress. You will need to look at resources beyond the seminar. A good place to start is [http://www.genox.com/what\\_is\\_oxidative\\_stress.html](http://www.genox.com/what_is_oxidative_stress.html) or <http://www.scienceinschool.org/2009/issue13/antioxidants>
3. It is well known that diet and lifestyle impact on health. Scientists have shown that in addition to environment during adulthood impacting on likelihood of disease, the environment that we are exposed to in the womb can alter our metabolic pathways and increase our likelihood of suffering from a number of adult diseases. Scientists are currently exploring why this happens and predict that it may be a result of epigenetic modifications in the relevant genes.

**Using the information presented in the seminar paper and your knowledge of gene expression, explain what is meant by epigenetic modification and why these modifications could potentially alter the phenotype that is expressed.**

**POST YOUR IDEAS, QUESTIONS AND SUGGESTED ANSWERS AT**  
[http://lens.auckland.ac.nz/index.php/Seminar\\_1\\_2010\\_Discussion\\_Page](http://lens.auckland.ac.nz/index.php/Seminar_1_2010_Discussion_Page)

### **Level 3 Achievement Standards linking to this seminar:**

AS 90714 Biology 3.2 Research a contemporary biological issue

AS 90715 Biology 3.3 Describe the role of DNA in relation to gene expression

### **Key Concepts from Level 3 Biology that link to this seminar:**

Below are selected objectives from the Year 13 biology programme that link to this seminar. THESE ARE NOT A FULL LIST OF THE CONCEPTS IN YOUR COURSE. You may wish to review these concepts before the seminar.

#### **Gene Expression / Genetics:**

- Describe DNA in terms of structure and function
- Describe the process of DNA replication and the role that enzymes have in this process
- Describe the process of protein synthesis and the role of DNA and enzymes in the production of proteins
- Describe the role of DNA in gene expression and the determination of phenotype
- Describe the control of gene expression at the transcriptional level in prokaryotes and eukaryotes
- Describe the role of metabolic pathways in the control of gene expression
- Explain the role of gene-gene interactions (epistasis, collaboration and polygenes) in determination of phenotype.
- Explain the potential effect of environment on expression of genes (although this is not a specific objective from the Y13 programme, understanding of this concept will allow you to understand metabolic pathways and control of gene expression—e.g. think about how the lac-operon is controlled by the presence or absence of lactose).

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