LENScience CONNECT
Bringing Schools and Scientists Together

LENScience Senior Biology Seminar Series
Student Update Number 9 – May 12th, 2011

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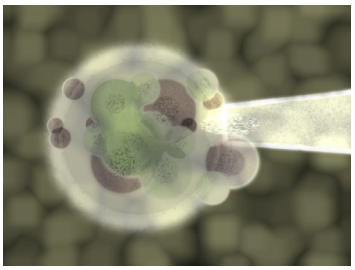


Seminar 3 — Questions

Aneuploidy and Biotechnologies

Thanks to everyone who participated in the seminar yesterday.
The LiveChat and questions that came up during the seminar were impressive.

For information about support for people and families affected by Down Syndrome contact.....

New Zealand Down Syndrome Association

http://www.nzdsa.org.nz

Keep an eye on the Question Page on the wiki—this will be updated with answers to your questions over the next week thanks to Richard, Bert, Jenny, Mark and the team from the Fertility Associates and the Liggins Institute.

FERTILITY associates | a better understanding TE RAUHANGA O TE WHARETANGATA

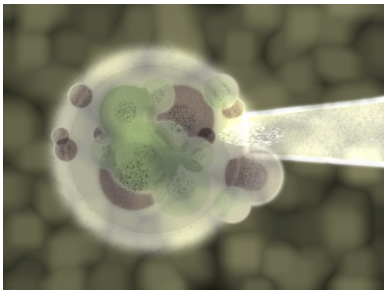
Richard Fisher | Bert Stewart | Mark Green

NATIONAL RESEARCH CENTRE FOR GROWTH AND DEVELOPMENT

LIGGINS INSTITUTE
THE UNIVERSITY OF AUCKLAND
NEW ZEALAND
Te Whare Wānanga o Tāmaki Makaurau

Seminar 3 Week 3 Challenge Questions

Human Aneuploidy and Related Biotechnologies

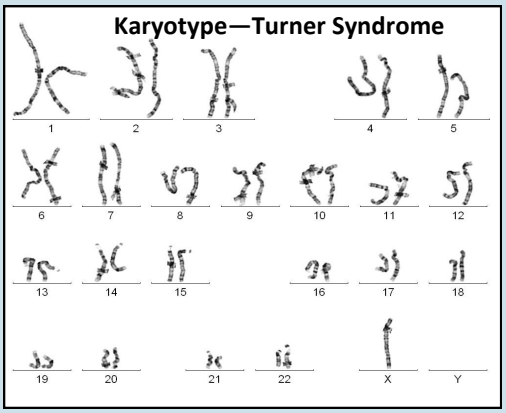


Week 3: May 16—20

- Go to your POST-SEMINAR SCHOOL WORKSHOP on the CHALLENGE QUESTIONS .
- Work together with your group to develop answers to the challenge questions and place these on the wiki.
- Each challenge has its own wiki page.
- Keep a watch on the wiki to see how the LENScience team and Fertility Associates respond to your answers. If they challenge you with a question or a suggestion about how to improve your answer —follow through.
- Watch the wiki and learn from what other people are writing.

Challenge 1:

Aneuploidy resulting in the loss of an entire chromosome usually results in a non-viable **embryo**. However, if the chromosome concerned is the X-chromosome the embryo may live. Explain why the loss of an entire **autosome** is almost always lethal but the loss of an **X-chromosome** may not be lethal.



Unpack the question

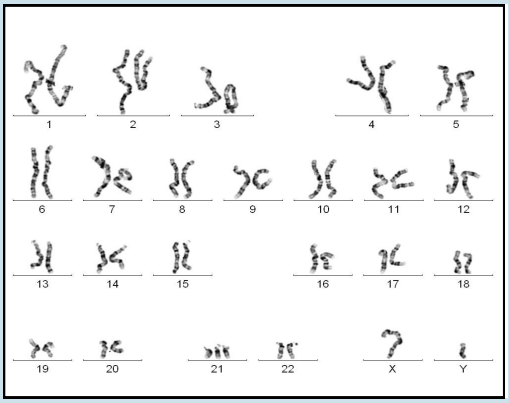
- Identify the differences between autosomes and sex chromosomes.
- Consider the differences observed between male and female karyotypes.
- Identify any differences between the function of homologous pairs of X-chromosomes and homologous autosomes in cells.
- Explain how the absence of a single chromosome may affect the functioning of cells resulting in death.

Challenge 2:

Compare and **contrast** the three possible mechanisms by which **Trisomy 21** can arise.

Unpack the question

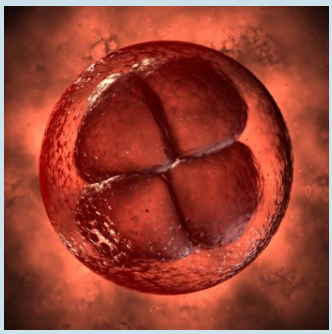
- Define what is meant by the term Trisomy 21.
- Identify the biological process by which cells with an altered number of chromosomes may be produced.
- Discuss the similarities and differences in these processes and the resulting outcomes.



Challenge 3:

Discuss how the use of named **biotechnologies** have enabled scientists to develop effective methods of **diagnosing genetic abnormalities in embryos** and how these technologies have met a human need or demand.

Unpack the question



- Go back into the seminar paper and the power point (available here), identify the biotechnologies involved in genetic diagnoses.
- In developing your discussion you need to think about who may wish to access these diagnostic techniques and why, in order to identify the need or demand.
- Explain the advantages and limitations of using different technologies in your answer.

Challenge 4:

Prenatal diagnosis occurs **during** pregnancy and involves either Chronic Villus Testing or Amniocentesis. Pre-implantation genetic diagnosis (PGD) occurs **before** pregnancy is established and uses a combination of IVF technologies such as Fluorescence *in situ* hybridization (FISH). These technologies have been established to meet a human need or demand.

(a) define the **human need and demand** that has led to the development of these technologies and discuss the **biological issues** that underpin this need.

Unpack the question

- Identify people who may request diagnostic testing prior to conception and during the early stages of pregnancy and why they may wish to do this.
- You may wish to discuss risk factors contributing to the presence of genetic abnormalities which may lead to the demand by specific groups of people in New Zealand.

(b) Discuss the ethical issues that arise from the use of these reproductive technologies. Consider whether there are any **differences between** the issues related to the two types of diagnostic testing (prenatal vs. PGD) from the perspective of a **range of identified groups** within New Zealand society.

Unpack the question

- In your discussion you will need to consider the multiple ways in which the results of diagnostic testing may inform prospective parents and the potential ethical implications of the results.
- You will need to identify the **advantages or limitations** of each type of diagnostic testing.
- When examining the ethical issues, remember you should include a diverse range of view points of different groups within society to create a discussion relating these viewpoints to the biology of the need or demand.
- Organisations such as the New Zealand Down Syndrome Association have official positions which you may reference and use as a starting point to identify ethical considerations. Find the NZDSA's prenatal position statement here.
- This is a question that you could use to start you off on your research for AS 90714—Research a contemporary biological issue.

Login and contribute your answers at

http://lens.auckland.ac.nz/index.php/Seminar_3_2011_Discussion_Page

Registering for the wiki and LiveChat

Congratulations to the all the students who have completed their personal registration. Just a reminder...

Make sure **YOUR** friends have registered.

The student registration link on the web page or directly here.

The question and discussion pages are protected so that only registered users can edit or write to them.

If you want to ask a question or contribute to the discussion about the challenge questions you will need to login. You automatically get a username for the wiki when you register for the seminar series.

If your school has permitted access to chat during the seminars you will also be sent a username and password for the live chat.

If you forget your password email lensciencehelp@auckland.ac.nz and we will send it to you again.

Information about how to login is found in Student Update Number 1.

What is happening in your school?

We would love to profile some of your schools.

Let us know what you are doing. How is your school organising your workshops? How many of you are participating? Do you have a biology or science prefect who is leading the student discussion contributions?

Send us your photos and news to share with other schools. LENSciencehelp.auckland.ac.nz