

LENScience Senior Biology Seminar Series Teacher Update Number 10– May 20th, 2011

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May 23—27

- Support and encourage students to enter Seminar 3 Challenge responses on the wiki
- Download the Seminar 4 resources (available from Monday 23rd May)
- Keep a watch on the wiki to see how your students are participating and the responses they are getting from the science and science education team.
- Hold a pre-seminar 4 school workshop for your students.

Seminar 3 Update

We have a large number of questions from seminar 3 which the team are working their way through—keep an eye on the wiki page

Seminar 3 best question award goes to Anhdao from Onehunga high School

Onehunga High School: Anhdao (question from LiveChat May 12, 2011)

Why does having a third chromosome 21 cause problems and how is the severity of down syndrome determined?

Having an extra copy of chromosome 21 effects the expression of genes on that chromosome, It is important not to think of genes as isolated entities, each being responsible for individual components. The products of genes interact with each other in subtle ways. The presence of too much product from a few genes on an extra chromosome may over-suppress or over activate expression of other genes, with a consequent potential cascade effect on other genes.

We do not understand the reasons why there is variation in the phenotype (severity) of people with Down Syndrome. "Some of the variation in phenotype may be attributed to situations where there is a mosaic pattern of trisomy 21. This is where there is not an extra chromosome in all the cells of the body, it is just in some of the cells, (those derived from the cell where the extra chromosome arose via non-disjunction). For instance if none of the cells in the brain were affected by the extra chromosome you would not expect to see the learning difficulties. This is part of the reason why we see varying degrees of severity in down syndrome but it is not the only reason. Most people with Down Syndrome have full trisomy 21 in all cells, yet we see major variations in the severity of the expression of the phenotype. The full reason for this level of variability in people who have full trisomy 21 in all cells is not fully understood.

Seminar 3 — Challenges Contributions are starting to come in. We are waiting for a few more of you to contribute before we comment so please encourage your students

Seminar 4 — Evolution of the Human Brain Professor Sir Peter Gluckman and his team will bring biological and cultural evolution to life in seminar 4, exploring the evolution of the human brain, and linking this to the challenges of our modern environment. Resources will be available online on Monday 23rd May.