

LENScience Senior Biology Seminar Series Student Update Number 5 – April 8th, 2011

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Seminar 2 Follow Up



Well done to you all for your contributions to the seminar yesterday. We are really impressed by the way you are all getting involved in the seminars. The questions that came through on the wiki, the video conference and in the LiveChat showed that you had done your reading and were thinking about the concepts.

The live chat was also fantastic – if you didn't take part – try it next time – it has a life of its own. Jacquie, Shawn and Helen were really impressed by your discussion throughout the seminar and the questions that you came up with.

Particular congratulations to the students of these schools. We're impressed by how quickly you've grasped the idea of what the LiveChat is for. It was great to see the way you were thinking about what other students were saying and then building on their contributions.

As normal, we didn't have time to answer all of the questions that came through from the LiveChat. But we will. We have passed all these questions onto Lisa and her team to answer.



Over the next few days we will post all of the questions from the seminar and the LiveChat onto the webpage with their answers. So if your question didn't get answered during the seminar then check on the [Rethinking Polynesian Origins Question page](#) later next week. You can also add more questions to this page at any time during next week.

Seminar 2—What happens next?

Seminar 2 Week 3: April 11th—15th

- Go to your POST-SEMINAR SCHOOL WORKSHOP on the [CHALLENGE QUESTIONS](#).
- Work together with your group to develop answers to the challenge questions. The next section will help you to unpack these questions.
- Post your answers on the wiki. Each challenge question has its own [wiki page](#).
- Keep a watch on the wiki to see how the LENSscience and Lisa's teams 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: DNA

The scientific team investigating the migration of the Pacific used both ancient and modern mitochondrial DNA (mtDNA) in their investigations.

Discuss **why** mtDNA rather than nuclear DNA is used in research like this and the **differences** in information that can be obtained from ancient and modern mtDNA samples.

Unpack the question

1. Start by defining what mtDNA and nuclear DNA are.
2. The question asks for reasons **why mtDNA rather than nuclear DNA** is used in this research. This wording indicates that you need to look at the differences between mtDNA and nuclear DNA—consider ideas such as where the DNA is found, how it is inherited, and the quantity available to be extracted.
3. In your answers link these differences to why mtDNA can be more useful in this type of research than nuclear DNA.
4. The second part of the question ask you to **discuss the differences between ancient and modern mtDNA samples**. Start by defining what ancient and modern DNA are. Then identify the differences between these two types of samples and explain the reasons why the differences exist.
5. As it is a discuss question you need to go further than just explaining the differences between the two types of DNA—look at the differences in the context of the research story—migration in the Pacific.



Challenge 2: What is a species?

Some scientists now think that Neanderthals, modern humans and Denisovans should all be considered sub-species of *Homo sapiens*. The problem is biologists have different ways of defining species. Three of the most common are the biological, morphological and phylogenetic species concepts.

Compare and **contrast** the three methods. **Discuss** the strengths and weaknesses of each method and discuss the limitations of using only DNA evidence to decide on whether two populations are a different species.

Unpack the question

1. Start by identifying the key features of each species concept—biological, morphological and phylogenetic.
2. Think about the type of information each concept uses to define a species—can you think of examples where this information might not be available?
3. Use this to compare and contrast the strengths and weaknesses of each method.
4. Finish by considering how DNA evidence alone can be used to identify a new species and what the problems or limitations to using DNA evidence might be.

Challenge 3: Advances in Biotechnology

The research described in the seminar paper challenges the traditional Lapita-only model of human settlement of the Pacific and suggests that there may have been several waves of migration into the Pacific, including the early Lapita migration. Use the information in the seminar paper and your understanding of biotechnologies to answer the following question:

Discuss the ways in which biotechnology has **advanced** the ability of scientists to investigate the hypothesis that there was more than one wave of migration into the Pacific.

Unpack the question

1. Note that the word **advanced** has been bolded in this question. This indicates that you need to look at **changes** in biotechnology rather than describing specific biotechnological techniques.
2. Start by identifying what biotechnological techniques would have been used in the past and their limitations.
3. Then look at the techniques that are used now—Lisa mentioned these in the seminar—next generation sequencing, advances in computing power and software and the ability to get DNA from ancient remains.
4. What advantages do these more recent biotechnological techniques have over the older ones?
5. How does this advance the ability of scientists to further understand Pacific migrations?

Registering for the wiki and LiveChat

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.

Congratulations 700+ students who have completed their personal registration for the seminar series.

Have you **registered**?

Make sure **YOUR** friends have **registered**.

The student registration link [on this web page](#) or directly [here](#).



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

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

Information about how to login to the wiki is found in [Student Update Number 1](#).

Seminar Series Awards

A reminder that we have awards for the best contributions for each seminar—questions and the wiki challenge questions discussion.

At the end of the year we will also be making an award to the best overall contribution from a student and from a school, as well as the best supporting teacher. For best contributing student we will be looking at the questions you ask, your contributions to the wiki challenge questions discussions and your involvement in the LiveChat.

