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Assignment 6

History

1. Who were the Romanov's (in Russian history)? The Romanovs were an imperial monarch who ruled Russia for many years. The Family was executed and killed, which was ordered by the Ural sovients. The Dna of the family was found in the graves and examined which led to understanding of certain genetic diseases.

2. How long had the Romanovs been in power in Russia? They were in power in Russia for more than 300 years.

3. Nicholas II was the last Romanov to hold power in Russia. What was his title? He was the last russian emperor.

4. What happened to Nicholas II? Why (from a geopolitical view)? Who then took control? His bad decisions in the russian revolution led to his overthrow. The Bolsheviks took control in 1917 of october.

5. Describe the family of Nicholas II. What happened to them? His family were the wife, the Tsarina Alexandra, and their five children: Olga, Tatiana, Maria, Anastasia, and the Tsarevich Crown Prince Alexei were held in exile in Yekaterinburg by the ural soviets to be held and soon bayoneted and executed; their dna was soon discovered.

6. One of the reasons that the family of Nicholas II was executed was because there was a fear that the White Russian Army would save them. Who was the White Russian Army? They were the counter-revolutionary armies and groups that were active during the russian civil war that may have been able to rescue the tsar and his family from imprisonment.

Hemophilia

The pedigree chart below comes from the Module powerpoint lecture notes.

7. How was Nicholas II wife, Alix, related to Queen Victoria of England? His wife was one of the granddaughters of queen victoria, Nicholas was the nephew of queen alexandra who was related to the queen. This makes The tsar and his wife actually related.

8. In a couple of sentences, describe the disease hemophilia. This disease stops the regulation of blood clotting, which can cause a hemorrhage and bleeding out . The gene is located on the x chromosome and has a recessive pattern.

9. What type of hemophilia (A or B) is (probably) represented in the pedigree chart? This is hemophilia B.

10. Using your knowledge from Module 4, on what chromosome is the gene that causes hemophilia? On the X chromosome

11. Describe the mutation that apparently caused hemophilia in Alix, (and probably all of the European families that had hemophilia). There was a mutation in the clotting factor 9 in Alix which caused the low levels of the protein.

12. Using your knowledge from Module 7, describe how the mutation you described in #10 could result in a faulty gene product. The gene is X-linked recessive which is passed mostly from the mothers and its females usually become carriers of the gene but males have worse conditions because of only having one x chromosome.

13. Again, using your knowledge from Module 4, give the genotype for a carrier of hemophilia.
XHXh

14. The Romanov's son, Alexis, had hemophilia. Describe how Alexis genetically acquired hemophilia. (Use a Punnett square. You can either draw a table or line up the genotypes.)
He inherited it because his mother was carrier

Punnett square	XH	Y
XH	XHXh	XHY
Xh	XHXh	XhY

15. Using a Punnett square (again, draw a table or line up the genotypes), explain why only males in the pedigree chart have hemophilia. (Choose at least one of the males represented in the pedigree chart, and show his parents in the Punnett square.)
Men have a statistically Higher chance of getting compared to women. They have a 50% chance while women have less of a chance. Men also have only one X chromosome which makes it very vital for them.

Punnett square	XH	Y
XH	XHXh	XHY

Xh	XHXh	XhY

16. Is it possible for a female to inherit hemophilia, and, if so, how? Yes but only if Two of the X chromosomes have the mutation or only if one x chromosome is active. Or If the mother is a carrier and the father has the disease.

17. Using a Punnett square (again, draw a table or line up the genotypes), what is the probability the daughter of a mother who is a carrier and a father who does not have the disease, will be a carrier?

The probability of about 1/4

Punnett square	XH	Y
XH	XHXH	XHY
Xh	XHXh	XhY

18. Using a Punnett square (again, draw a table or line up the genotypes), what is the probability that 4 daughters of a mother who is a carrier and a father who does not have the disease, will be a carrier?

Punnett square	XH	Y
XH	XHXH	XHY
Xh	XHXh	XhY

19. Using a Punnett square (again, draw a table or line up the genotypes), explain why none of Alexi's sisters had hemophilia. Because Alexi's mother was a carrier and the Father did not

carry or have the disease. All of the sisters will only be heterozygous for the gene or homozygous dominant, which may not be a carrier or have the disease.

Punnett square	XH	Y
XH	XHXH	XH Y
Xh	XHXh	XhY

20. Some historians speculate that Alexis' hemophilia condition could have led to the Russian Revolution. Explain. His son, Alexis needed healing so with the help of Rasputin, a faith healer. He used his connections to influence many governmental affairs. It is believed that his ideas made people question the government and become a factor of the revolution.

Molecular Analysis of People in a Mass Grave

21. Two "graves" were discovered near Yekaterinburg, Russia. Describe the number of bodies in each grave. Nine of them were buried in one big grave while two of the children were buried in a separate grave.

22. When were these graves discovered? The graves were discovered in 1970 and another finding in 1991. The last remains were found in 2007.

23. What type of testing was done to confirm sex and familial relationships among the remains found in the mass grave? using mitochondrial DNA, autosomal STR, and Y- STR testing. Also additional DNA testing of material from the 1991 grave.

24. Genetically, what does STR "stand" for? Short tandem Repeat

25. Mitochondrial DNA testing was also done on both Nicholas II and Alix. Why was information from Alix's, but not Nicholas', mitochondrial DNA used to identify three females as belonging to Alix? Mitochondrial DNA is passed down from the mother to offspring

26. HRH Prince Philip, the Duke of Edinburgh, provided mitochondrial DNA used to identify Alix and her three daughters.

Why was his mitochondrial DNA used?

Who is the HRH Prince Philip, the Duke of Edinburgh in today's world? Do you ever hear of his grandchildren or great-grandchildren (in *People* magazine while you are waiting to check out of a store)? His mitochondria was used because he is the only living son of the Tsarina, Alexandra. Today, Prince Philip is the husband of Queen Elizabeth II. Prince Harry is one of his grandchildren and he is married to Meghan Markle

27. Who was missing from the mass grave? The Tsarevich Alexei and one of his sisters were missing and their graves were recently discovered.

28. The Duke of Fife and Princess Xenia provided mitochondrial DNA used to identify Nicholas. One of these is a female and another is a male. Does that matter? What general statement can you make about their genetic relationship to Nicholas and Alexandra? a. if they were trying to conduct a test to identify Nicholas' parents it would matter. They used the mitochondria to relate the remains. Both individuals are siblings to Nicholas, and so they all have the same maternal mitochondrial DNA.

29. What was discovered in the mitochondrial DNA of Nicholas that was not identified in either the Duke of Fife or Princess Xenia?. The heteroplasmy differed in ratio of C and T.

30. What is the term given to the existence of two (or more) genetically different mitochondria in the cell? Heteroplasmy

31. What three types of DNA were used to test the remains found in a second grave? Nuclear, mitochondrial, and DNA that was already found and ancient

32. Of the three types of DNA you listed in #32, which one would have been used specifically to identify Alexis? Mitochondrial

33. What was the source of the DNA used to identify Alexis? They found bone fragments and teeth

34. Was Anastasia in the grave in which Alexis was found? No she was not

<u>Who Wants to Be Anastasia?</u>

35. Give a brief history (2-3 sentences) of Anna Anderson-both her claims and what is thought to be true. She said she was the missing princess, Duchess Anastasia. People thought that she was lying or she was Franziska Schanzkowska.

36. Where in the US did Anna Anderson eventually settle? In charlottesville VA

37. Whom did she eventually marry? John E. Manahan

38. What were the sources of Anna Andersons's nuclear DNA? The intestines and the hair

39. What were the sources of Nicholas' and Alix's nuclear DNA? bones

40. What type of analysis was done on DNA from Anna Anderson, Nicholas, and Alix? STR, mitochondrial and nuclear analysis.

41. Anna Anderson's mitochondrial DNA was compared to the mitochondrial DNA of what two people? Carl Maucher and the duke of Edinburgh

42. A hypervariable region of the mitochondrial DNA was analyzed. Define a hypervariable region?
The region in DNA that undergoes many changes.

43. What were the conclusions from the mitochondrial DNA comparisons?
Anna Anderson was not related to the royal family . She was the missing Franziska Schanzkowska.

44. The article which describes the analysis of Anna Anderson's DNA was published in 1995.

When were all of Nicholas' and Alix's children finally accounted for? In 2007

45. Before doing this assignment, what did you already know about the last Tsar of Russia and his daughter Anastasia. What did you learn from doing this assignment? I knew that he and his family were exiled and killed because of his decision. I also knew Anastasia had possibly not been killed and that there are rumors she escaped. I learned alot about the family and the siblings and I recalled my memory about the hemophilia disease and how it is expressed.