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Bio 303

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1. Who were the Romanov’s (in Russian history)?

The Romanov’s were the last dynasty that ruled Russia from 1613 to 1917.

1. *Briefly* outline the Romanov lineage.

The Romanov’s lineage started with Michael I who ruled from 1613 to 1645. Then came Alexis son of Michael I from 1645 to 1679. Feodor III, son of Alexis came next from 1679 to 1682. Feodor older sister Sophia took reign from May 1682 to 1689. Ivan V ruled until 1969 with his brother Peter I who remained in charge until 1725. For two years Peters wife Catherine I ruled. Peter II followed from 1727 to 1730. Ann son of Ivan V had power for ten years from 1730 to 1740. For about a year Ivan VI was in charge from 1740 to 1741. Followed by Elizabeth daughter of Peter I from 1741 to 1762. Peter III was only in charge for 6 months before he was murdered. At that time Catherine II his wife took charge from 1762 to 1796. In 1796 Paul I son of Peter III and Catherine II took charge until 1801. For the next 24 years Alexander I was in charge. In 1825 Nicholas the first took charge until 1855. Followed by his nephew Alexander II until 1881. It was Alexander the third who followed until 1894. The last of the Romanov family was Nicholas II who ended in 1917.

<https://en.wikipedia.org/wiki/List_of_Russian_rulers>

1. Nicholas II was the last Romanov to hold power in Russia. What was his title?

He was Nicholas II Emperor and Autocrat of all the Russias. He was a Tsar.

1. What happened to Nicholas II? Why (from a geopolitical view)? Who then took control?

Nicholas II was forced to renounce his throne due to the February Revolution in 1917 and although the throne was offered to the next heir he declined the position and the throne was vacant for a while.

1. Describe the family of Nicholas II. What happened to them?

Nicholas II was married to Princess Alix of HesseDarmstradt and had 5 children in attempts to create an heir to the throne. The first 4 were daughters and the last was a son who was born with hemophilia.

Part II: Hemophilia

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

6. How was Nicholas II wife, Alix, related to Queen Victoria of England?

Both Queen Victoria and Alix are designated as being carriers for hemophilia.

She was Queen Victoria’s granddaughter.

7. In a couple of sentences, describe the disease hemophilia.

Hemophilia is a blood clotting disease. Someone with hemophilia will bleed severely no matter the injury due to the reduce ability for blood clotting.

Use the following source for the questions 8 & 10: [*http://www.ncbi.nlm.nih.gov/pubmed/20557352*](http://www.ncbi.nlm.nih.gov/pubmed/20557352) *(You won’t be able to access the entire article, but the abstract will give you the information you need to answer the questions.)*

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

Hemophilia B is most likely in the pedigree chart.

9. 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.)

Since hemophilia is an X-linked recessive gene, it is assumed that Alexis got this from his mother because she is the one who contributed the Xh  to his DNA.

10. Using a Punnett square (again, draw a table or line up the genotypes), explain why only males in the pedigree chart have hemophilia.

Females can be carriers of hemophilia but because they have XX they would not display symptoms of hemophilia. One the other had males have XY so if the X is carrying hemophilia they would have hemophilia such as Alexis did.

11. Is it possible for a female to inherit hemophilia, and, if so, how?

Although super rare it is possible for females to inherit hemophilia. In this case both X chromosomes would need to display the mutation that causes hemophilia.

12. None of Alexis’ sisters are shown to have hemophilia. Using only the tools available at the time they lived, how could it have been determined whether they were carriers like their mother.

To find out if any of Alexis sisters were carriers they would need to have children and if those children displayed hemophilia then they were carriers.

13. 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?

As per the Punnett square it is a 25% chance of having a daughter that doesn’t have the disease but if we look at just the female children then there is a 50% chance that the daughter will be unaffected by hemophilia.

14. 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?

The probability that all four of the daughters are carriers of the disease is a 6.25% percent chance. It is likely that at least one will be a carrier but with the mother as the only affected parent it is unlikely that all four will be carriers.

15. Using a Punnett square (again, draw a table or line up the genotypes), explain why none of Alexi’s sisters had hemophilia.

Alexi’s sisters do not have hemophilia because their father was not a carrier of this disease. It would require both parents to be carriers for it to affect any female.

16. Some historians speculate that Alexis’ hemophilia condition could have led to the Russian Revolution. Explain. You probably want to look up the faith healer Rasputin.

Although Rasputin only had influence on the imperial family where it concerned Alexis, it could be speculated that a Russian revolution could have been a result of this mans acts. While he was assisting them with their sick son, his position with the family was used to undermine the dynasty in hopes of starting a reform. The press painted his behavior badly and went on to say he was the Czarina’s advisor which upset many. This almost led to the Russian Revolution.

https://www.biography.com/people/rasputin-9452162

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| XH | XH XH | XHXh |
| Y | XHY | XhY |

This punnett square is for all the questions that require a Punnett square.