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## Anastasia and the tools of justice

Four years ago, in Ekaterinburg, Russia, a shallow grave was discovered. Authorities excavated the badly damaged remains of nine bodies. Conventional forensic analysis revealed that all nine had been brutally murdered and details of the find strongly suggested that the grave contained the bodies of the last Tsar and Tsarina of Russia,

three of their four daughters and four other adults. There was, however, no sign of their only son, Prince Alexei nor of the fourth daughter, thought to be the youngest Grand Duchess, Anastasia. In 1992, the UK Home Office Forensic Services were asked to conduct DNA tests on the remains, results of which confirmed that a family unit of two parents and three daughters was indeed present. Comparison of their mitochondrial genomes to

those of living maternally related descendants of the Romanov lineage, including the Duke of Edinburgh, revealed a common sequence thus supporting the hypothesis that the remains were indeed those of the Romanovs (Gill, P. *et al.*

*Nature Genet.* 6, 130–135;1994). Many questions remained, however — not least, the whereabouts of the missing children.

In 1921, a patient of a mental hospital in Berlin claimed to be Anastasia. For the rest of her life, this woman, who later moved to the United States and settled in Charlottesville, Virginia where she was known as Anna Anderson, held steadfastly to her claim. She died in 1984. Views on her authenticity were polarised: most surviving members of the Russian nobility refused to accept her, whereas she won over many of the residents of Charlottesville who were adamant that she was telling the truth. One strong supporter of Anderson, a local lawyer named Richard Schweitzer, was married to a woman who claimed to be a descendant of the Tsar's private physician, Eugeny Bodkin, thought to have been one of the nine murdered by the Bolsheviks in 1918 and discovered in the Ekaterinburg grave. Schweitzer was aware that a local Charlottesville hospital was holding biopsy samples, removed from Anna Anderson as part of an examination for suspected cancer years before her death. Members of the Russian Nobility Association (RNA) heard that he intended to retrieve the samples and tried to stop him on the grounds that Schweitzer might have them analysed and compared to the Romanov DNA sequences but only make public the results if they suited his cause.

Earlier this year, a court hearing before a Charlottesville judge was arranged. The RNA argued that the samples should be split and simultaneously analysed by at least two qualified, independent groups; Schweitzer argued that he

IMAGE  
UNAVAILABLE  
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REASONS

The four Grand Duchesses. From left to right, Marie, Tatiana (seated), Anastasia and Olga.

had a reasonable claim on the samples and should be allowed to take them; and the hospital representative pleaded with the judge to solve the conundrum. Protracted explanations of mitochondrial and nuclear inheritance, the chemistry of formalin-fixed and paraffin-embedded biopsy samples, and the molecular biology of the polymerase chain reaction were thrust upon a somewhat unsuspecting court and an altogether disgruntled judge made it clear that he had better things to do than settle the squabbles of two dogmatic parties each of which had, through decades of infighting, developed extreme paranoias.

In fact, the genetic jockeying in the court room, interesting though it was, did not amount to much as the judge instructed the two parties — who, after all, both sought to have the samples tested — to settle their differences out of his court. Schweitzer subsequently persuaded the local hospital that the samples would be safe with him and commissioned Peter Gill of the UK Home Office Forensic Laboratories to determine whether or not the Anderson biopsy sample was genetically linked to those of the other Romanovs.

Support and backing for the RNA came from a German film producer, Maurice Philip Remy, who had become aware of other potentially useful samples. Between leaving Russia and settling in Charlottesville, Anderson spent many years in Germany. During this time she had blood samples taken to investigate the possibility that she had haemophilia and Remy arranged for two surviving samples to be tested. The first, mere traces of blood in a syringe dating from the late 1950's — and kept as a souvenir by a local physician — revealed traces of DNA with no match to any of the Romanov samples. This test was easily dismissed, however, as the age and condition of the syringe did not rule out the possibility of contamination. The second sample, a glass slide with a smear of blood on it, and thought uncontaminated, was sent to the Anthropology Institute of the University of Goettingham, where Professor Bernd Herrmann and colleagues were more successful. Thus, three days before Gill was due to present his results at a high profile press conference, Remy announced that analysis of nuclear DNA extracted from the blood on the slide revealed that Anderson was not related to the Romanov family. Subsequently, and with Schweitzer sitting next to him, Gill confirmed that Anderson was not a Romanov. In fact, he said, she was most likely a Polish farm worker who,

following a series of personal tragedies, had gone missing in 1920 to reemerge a year later and claim the Anastasia title during her confinement in the Berlin mental hospital.

So it would seem that DNA analysis has brought to a close a romantic but ill-conceived story. Two independent groups have used well established DNA techniques to arrive at the same conclusion. Why is it then that Schweitzer and his supporters refuse to accept the results and are even now exploring other ways of proving themselves and the late Anna Anderson right? What, given such reluctance, does the scientific community have to do to convince the public that it knows what it is talking about and is accurate in its assessments?

In a bizarre twist, there appears little hope that the pro-Anastasia group will be successful, since a totally independent confirmation of the Gill results has emerged. Following Anderson's death a local amateur historian, Susan Burkhart, was given access to her meagre estate, and while flicking through a book came across an envelope containing a lock of hair that matched Anderson's. When Peter Kurth, an author who has written extensively on the Anastasia pretenders and a supporter of Anderson, heard of this he arranged for the hair to be analysed by Mark Stoneking, of Pennsylvania State University, an expert on mitochondrial genetics. Together with a colleague, Terry Melton (who was brought up in Charlottesville and had actually met Anna Anderson), he extracted and sequenced part of the mitochondrial genome. When Gill learned of this parallel test, he contacted Stoneking and to their great relief it was revealed that both groups had derived an identical sequence. Despite this third analysis, Schweitzer will still not accept the results.

Does this distrust extend to the general public which has been witness to many arguments for and against the use of genetic testing in courts of law? Many of these arguments have been between clever lawyers but many others have been between geneticists. Now it must be made clear that there is no longer any reason to mistrust these techniques. Initial problems have been solved, standard techniques established and statistical criteria set. This is especially important as Judge Lance Ito starts to hear the DNA based evidence in the celebrated murder trial of O.J. Simpson, a trial that will be avidly followed by millions and will therefore exert an immense influence on the public's acceptance, or otherwise, of these powerful tools of justice. □