

Genealogy and DNA – by Gary Merrylees

DNA testing is fast becoming the new frontier in family history research.

Genealogists world-wide are currently using the services of specialist DNA testing laboratories like Oxford Ancestors in England, and FamilyTreeDNA in the U.S.A., to determine whether or not those with the same surname are related.

Before proceeding further an explanation of what is meant by DNA would be helpful. Writing in the August 2002 issue of 'Family History Monthly,' genealogist Robert MacAndrew describes DNA in layman's terms:

"At its simplest, deoxyribonucleic Acid, better known as DNA, is the blueprint for building and maintaining the human body. It comes in two forms, nuclear DNA and cytoplasmic DNA – which is also called mitochondrial DNA (mtDNA). The nuclear DNA is found in every nucleated cell in the body, while mitochondrial DNA is found in the cell cytoplasm outside the nucleus... Nuclear DNA is found in relatively short lengths as 23 pairs of chromosomes. In each pair, one chromosome comes from the mother and one from the father. One pair, the sex chromosomes - named X and Y, do not exchange DNA. A male has both X and Y chromosomes, while the female has two Xs. Since the Y chromosome determines the sex of the child it is passed from father to son – therefore all males will have the same Y chromosome as their fathers. As a result it is a useful tool to prove or disprove paternity. It can also be used to show if two men who have the same surname are descended from the same progenitor..."

COMMON ANCESTOR

By comparing the 'genetic fingerprints' of selected males it is therefore possible to identify a common ancestor many generations back enabling genealogists to link families with the same surnames or variants of the name as it has evolved over time. DNA testing is not a replacement for the genealogist, but rather it is a valuable additional tool. The objective usually is to identify those who are related, but DNA testing can also prove or disprove theories regarding ancestors, solve brick walls in research, determine a location for further research and validate existing research. An example is the 'Burgar Family Genetic Signature' printed in the same issue of 'Family History Monthly' (*reproduced above*). Using a 10-marker comparison test, seven fami-

BURGAR FAMILY GENETIC SIGNATURES

Name	Country of origin	Date*	DNA values for the 10 portions of DNA									
			1	2	3	4	5	6	7	8	9	10
Bill Burgar	England	1742	14	12	24	11	13	12	10	16	12	12
Andrew Burgar	England	1742	14	12	24	11	13	13	10	16	12	12
Jack Burgess	Shetland	1750	14	12	24	11	13	13	10	16	12	12
Bertie Burgess	Shetland	1700	14	13	24	11	13	13	10	16	12	12
John Burgher	Orkney	1720	16	12	25	11	11	13	11	17	12	12
Freddie Burgar	Orkney	1720	16	12	25	11	11	13	10	17	12	12
Peter Burges	Orkney	1740	16	12	25	11	11	13	11	17	12	12

*The date of birth of the earliest proven ancestor.

lies living in different parts of the British Isles and sharing four different name variations agreed to DNA analysis to find out if any of the families were related to each other. The results are shown in the table comprising 10 columns representing a portion of DNA, Each column contains a number (the DNA value) related to that portion of DNA. For two people to be related they need to have virtually the same DNA values in the columns 1 to 10. The test results show that the English and Shetland families have virtually the same values in column 1 to 10 (genetic signatures) and therefore are directly related. The two Shetland families are also related to each other. The three Orkney families are also linked, but not to the English or Shetland families.

MERRILEES CLAN FAMILY TREES

Over a 10 year period Merrilees Family Association (MFA) genealogists in Britain, Canada, Australia and New Zealand researched and recorded 33 Merrilees' family trees. The point was reached where they had almost exhausted all written records with their combined findings resulting in approximately half of the trees converging.



remaining trees. The MFA is using the services of FamilyTreeDNA, in the U.S.A., the world's first genealogy-driven testing company. They are initially comparing the DNA of six known clan families from samples provided by donors in Scotland, Australia, Canada, the U.K and the U.S.A. The collection procedure is quite straightforward. The DNA kit comprises a soft, sterile brush for the removal of loose cheek cells from inside the mouth. After the cells are obtained the head of the brush can be ejected into the provided tube containing

a lysis buffer which protects the DNA sample until it is received at the company's laboratory in Houston, Texas. The results are available in about three weeks. The cost is around US\$90 per sample plus the expense of sending out and collecting the test kits.

There is clear evidence that DNA testing can confirm findings from other sources. However, it should be emphasised that the genealogy must be done first and the DNA results simply confirm or discount relationships already deduced.

LIMITATIONS

There are limitations however. Firstly, and most importantly, this test is not applicable to females as the genetic signature is carried in the male Y sex chromosome. It is effectively a 'blood line' test which can only tell whether or not two males are directly related to a common ancestor. If you have the same DNA signature as another person then you will have the same forbear even though you might have different surnames.

If there is illegitimacy or adoption in the male line then the progeny of such a person will not be related to the common ancestor. For many family historians, illegitimacy or adoption may be irrelevant, and such progeny will carry the family name and be accepted as part of the family or clan. However, the DNA test would show that they are not related to the earlier ancestor by a direct blood line.

Robert MacAndrew concludes: "Undoubtedly over time as the technology improves and we understand more of the science, having a DNA test may become as accepted as a part of family history as logging onto the internet."