

# **Unlocking Relationships with DNA**

## **-by Dick McFarlane**

DNA (deoxyribonucleic acid) is a very powerful tool in helping genealogists break through research barriers. It does not involve exhuming dead bodies, nor does it replace the paper record and good old-fashioned detective work.

The Clan MacFarlane DNA Project has been in existence since 2004 and has some 274 participants from around the world. It includes MacFarlanes from the United States, Canada, Scotland, Britain, Australia, and New Zealand. The project has uncovered some interesting relationships. For instance, some of us MacFarlanes are more closely related to the Clan MacGregor.

To be able to use DNA data effectively in genealogical research one must have a basic understanding of what DNA is, the terms used to describe it, how it is passed on from parent to child, and how to read the data provided.

There are two sources of DNA that are of interest to the genealogist: Y-chromosome and mitochondrial DNA. Y-chromosome DNA refers to the DNA found on the Y-chromosome and is found only in males. It is passed on from father to son and can be used to determine relationships in a genealogical time frame. The Y-chromosome is the male sex hormone. See Chart 1 to see how the Y-chromosome passes through the male line

Mitochondrial DNA is found in both males and females, but is only passed on from mother to daughter. Mitochondrial DNA is used to determine descent in anthropological time frames. In other words, it can determine ones descent from ancient populations, but it doesn't help one find a great grandmother. Chart 1 illustrates the problems with trying to use DNA to trace ancestry through the female line.

A third category of DNA is referred to as autosomal DNA. Autosomal DNA refers to all other DNA in the body and is not usually involved in tracing ancestry, however it can be used to determine inherited factors, e.g., height, eye color, susceptibility to disease, etc.

It is important to understand the concept of genetic distance and genetic mutation. In analyzing the genetic profile of those individuals that have a close relationship or genetic distance, one can determine which individuals have a more recent common ancestor. At some point the paper record must be brought into the quest. By analyzing the pedigrees of those with whom one has a close genetic match it is possible to determine the more likely lines to research and thus be able to breach the barriers in your search.

## Selected Y-Chromosome Definitions

**Allele** – the number of repeats of a DNA sequence

**Base** – the four building blocks of DNA, simply designated A, T, C, & G (adenine, thymine, cytosine, guanine)

**Chromosome** – structures found in the nucleus of each cell. Humans have 23 pairs; 22 are called autosomal, one is the sex chromosome.

**DNA** – (Deoxyribonucleic acid) the genetic code that makes each of us unique, the genetic code that has been passed down through generations

**Exact match** – comparison between the DNA of two people that are exactly the same for all markers and regions compared

**Gene** – a region of DNA that codes for a specific function

**Genealogical time frame** – the most recent to 15 generations; recent genealogical time frame is one to five generations

**Genetic Distance (GD)** – the number of differences between two sets of results

**Haplotype** – a set of alleles that describe a person's genetic code

**Junk DNA** – DNA that doesn't code for genes, used for regulatory purposes

**Locus** – location in ones genetic code

**Marker** – physical location on the chromosome

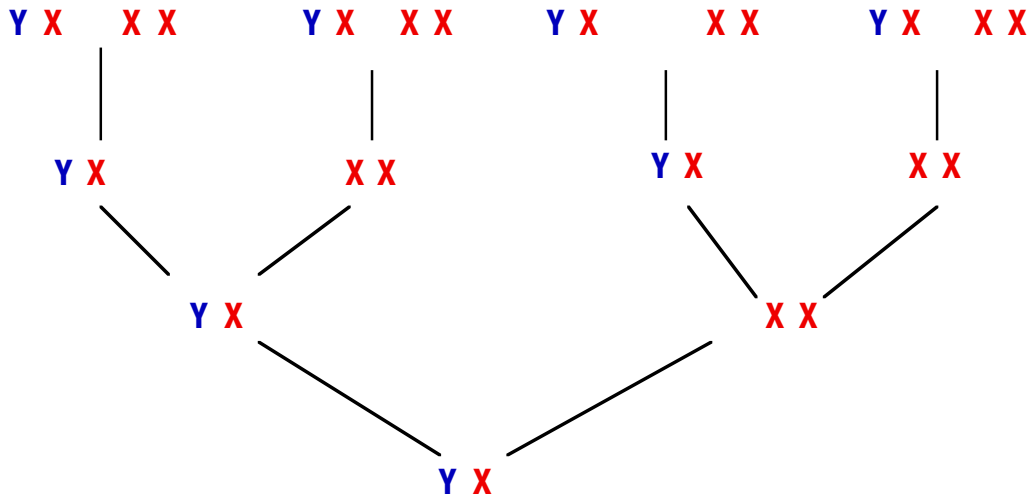
**Mitochondria** – material in the cell that produces energy; mitochondria is passed on to both males and females by the mother

**Mutation** – an inheritable change that occurs in genetic material; the change may be in the number of repeats or in one of the bases

**Mode** – most common result for each marker tested

**Organelle** – part of a cell that performs a specialized function, such as the nucleus or the mitochondrion

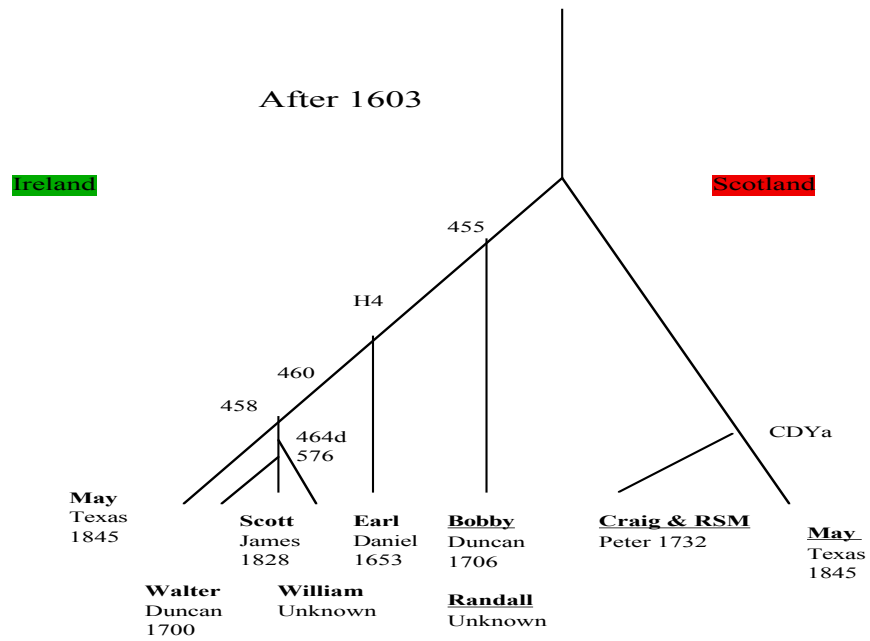
**Replication** – the process by which DNA copies itself



**Chart showing DNA Descendency**

Marker	Mode	56186	B1539	149452	120820	65802	206812	162109	130709	192536
393	13	13	13	13	13	13	13	13	13	13
390	24	24	24	24	24	24	24	24	24	24
19	14	14	14	14	14	14	14	14	14	14
391	10	10	10	10	10	10	10	10	10	10
385a	10	10	10	10	10	10	10	10	10	10
385b	14	14	14	14	14	14	14	14	14	14
426	12	12	12	12	12	12	12	12	12	12
388	12	12	12	12	12	12	12	12	12	12
439	12	12	12	12	12	12	12	12	12	12
389a	13	13	12	13	13	13	13	13	13	13
392	13	13	13	13	13	13	13	13	13	13
389b	30	30	30	30	30	30	30	30	30	30
458	19	19	19	19	19	19	19	20	20	20
459a	9	9	9	9	9	9	9	9	9	9
459b	10	10	10	10	10	10	10	10	10	10
455	11	11	11	11	11	10	10	11	11	11
454	11	11	11	11	11	11	11	11	11	11
447	25	25	25	25	25	25	25	25	25	25
437	15	15	15	15	15	15	15	15	15	15
448	19	19	19	19	19	19	19	19	19	19
449	30	30	30	30	30	30	30	30	30	30
464a	15	15	15	15	15	15	15	15	15	15
464b	15	15	15	15	15	15	15	15	15	15
464c	16	16	16	16	16	16	16	16	16	16
464d	17	17	17	17	17	17	17	17	17	16
460	11	11	11	11	11	11	11	11	12	11
H4	12	12	12	12	11	12	12	12	12	12
YCAa	19	19	19	19	19	19	19	19	19	19
YCAb	24	24	24	24	24	24	24	24	24	24
456	15	15	15	15	15	15	15	15	15	15
607	16	16	16	16	16	16	16	16	16	16
576	18	18	18	18	18	18	18	18	18	17
570	17	17	17	17	17	17	17	17	17	17
CDYa	37	37	37	36	37	37	37	37	37	37
CDYb	37	37	37	37	37	37	37	37	37	37
442	12	12	12	12	12	12	12	12	12	12
438	12	12	12	12	12	12	12	12	12	12
GD	-	0	0	1	1	1	1	1	2	3
Oka		SC - 1732	IR - 1700	SC - 1732	IR - 1653	VA/IR - 1706	UNK	VA - 1828	IR - 1700	VA - 1785

## Analyzing the DNA Data



So, Where to from here?

Peter McFarland

m. Janet Kirkwood  
30 Sep 1757

William McFarland  
b. 1758  
w. Glasgow

m. Elizabeth Walker  
1784

Margaret McFarland  
b. 1763  
w. Glasgow

Peter McFarland or line  
b. 1760  
w. Glasgow

m. Elizabeth Allan  
1783

Duncan McFarland  
b. 1765  
w. Glasgow

Jean McFarland  
b. 1785

Peter McFarland  
b. 1790

Robert McFarland  
b. 1794

John McFarland  
b. 1788

William McFarland  
b. 1792

Peter  
1833 Female

Peter  
1824 Female

John Isobella  
1813 1818

Alex  
1830

Peter James  
1818 1820

William Malcolm  
1815 1823

James  
1834

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m. Janet Kirkwood  
30 Sep 1757

William McFarland  
b. 1758  
w. Glasgow

m. Elizabeth Walker  
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b. 1763  
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b. 1785

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b. 1790

Robert McFarland  
b. 1794

John McFarland  
b. 1788

William McFarland  
b. 1792

Peter  
1833 Female

Peter  
1824 Female

John Isobella  
1813 1818

Alex  
1830

Peter James  
1818 1820

William Malcolm  
1815 1823

James  
1834

James McFarlane  
b. 1786  
w. Dumbarton  
m. Agnes Bryson  
Glasgow

Janet McFarlane  
b. 1793  
w. Dumbarton

?

Agnes  
1817  
Christian  
1821  
Margaret  
1815  
Peter McFarlane  
b. 1819  
Glasgow  
James  
1825

James  
1847

John McFarlane  
1877  
Arthur McFarlane  
1883

Craig McFarlane  
1937  
Raymond McFarlane  
1912

Richard McFarlane  
1938

Harrison Mays  
1845

Harrison Mays  
1872

Walter Mays  
1903

Edward Mays  
1925

Walter Mays (Lydia)

**Duncan McFarland** -- m. Anne Elizabeth Porter

B. 1700/06

John McFarland

William McFarlane

**Robert Henry McFarland**

Two Daughters

Alexander McFarland

B. 1750 | m. Ann

m. Mary Crawford

William M. McFarland

Joseph McFarland

**Robert C. McFarland**

Christopher McFarland

Two Daughters

B. 1781 VA | m. Catherine Hobbs

Four  
Daughters

Alexander McFarland

Nathan H. McFarland

**William Douglas McFarland**

Robert S. McFarland

John McFarland

B. 1821 TN | M. Martha Terrell

**Sally Mays**

**Harrison Mays**

B. 1845 TX | M. Alice Hennen Sinclair

**Walter Harrison Mays**

M. Lucille Smith

**Walter Harold Mays**

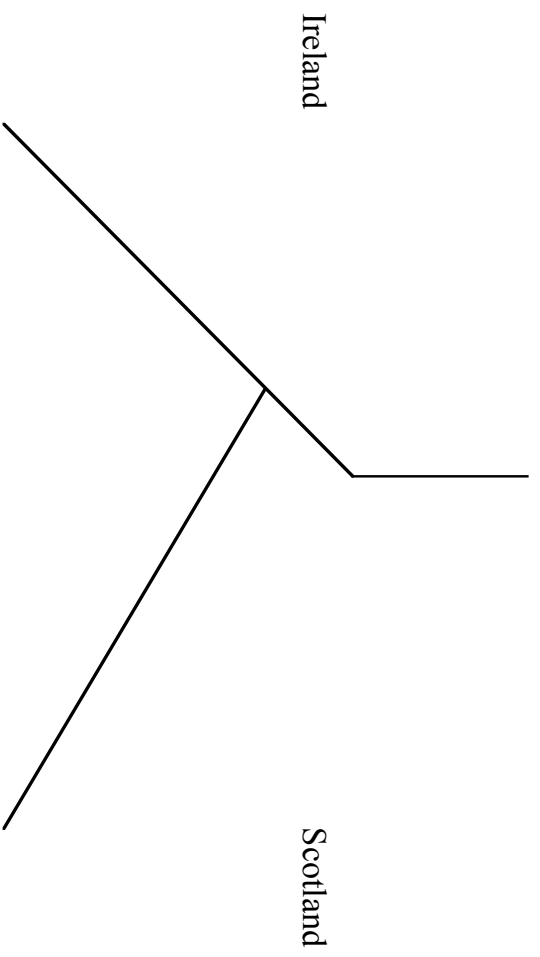
M. Rita Celeste Simon

**Edward Harold Mays**

M. Donna Louise Baker

**Walter Mays**

# Suggested Migration Pattern for McFarlane/McFarland



Duncan To  
America - 1718

Peter's Father (?) Returns to  
Scotland early 18th Century