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# Pinpointing the McDonald Paternal Ancestral Genetic Homeland

**A Scottish Case Study**

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### INTRODUCTION

A simple painless commercial ancestral Y chromosome DNA test will potentially provide one with the names of many hundreds of individuals with whom one shares a common male ancestor, but what often perplexes people is how one can match individuals with many different surnames? The answer is quite simple. The first male to call himself 'McDonald' was living in close proximity to others with whom he was related but who inherited other surnames like Wells, Thompson and Jones. Given that hundreds of years have passed since paternally inherited surnames became common, there will be many descendants of those individuals some of whom will today undergo commercial ancestral Y-DNA testing. Hence the surnames of one's ancestor's neighbours will be revealed in today's Y-DNA test results.

Early 19<sup>th</sup> century census data demonstrates that Scottish surnames could still be found concentrated in the areas from which they originated. One can therefore use census data to determine the origin of the surnames that appear in one's Y-DNA results, identifying an area common to all, and reveal ones '**Paternal Ancestral Genetic Homeland.**' The genetic homeland is the small area (usually within a 5 mile radius) where one's ancestors lived for hundreds if not thousands of years. It is the area where one's ancestor first inherited his surname surrounded by relatives who inherited others. It is the area where ones ancestors left their mark in its placenames, its history, and in the DNA of its current inhabitants. Since modern science can pinpoint a paternal ancestral genetic homeland it can also be used to confirm it by DNA testing individuals from the pinpointed area.

#### Notes of caution!

1. In Ireland each of the estimated 1,500 distinct surnames had a single founding ancestor, that's an estimated 1,500 Adams from whom anyone with Irish paternal ancestry can trace direct descent. But science has demonstrated that only 50% of males with a particular Irish surname will be related to the surnames founding ancestor, the other 50% of males will have an association that has arisen as a result of what are called 'non-paternal events' usually a result of adoptions or maternal transfer of the surname. Since Scotland adopted a similar Clan based society these scientific findings can be applied to Scotland and people with Scottish ancestry.
2. Often people are looking for their DNA results to trace back to a specific area. One must remember that the results typically reflect one's ancestor's neighbours from around 1,000 years ago. As a result, if one's Scottish ancestor was descended from an Anglo-Saxon settler, Viking raider, or 11<sup>th</sup> Century Norman one's DNA results will reflect earlier English, Welsh, French, and possibly Scandinavian origin. One must approach this process with an open mind!

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### Interpreting the Y-DNA test results

To pinpoint a paternal ancestral genetic homeland one must first identify the surnames that appear as one’s closest Y-DNA genetic matches. Those surnames, particularly one’s that *recur* throughout one’s Y-DNA results will typically reflect the surnames of one’s medieval ancestor’s neighbours. Mr McDonald’s closest Y-DNA genetic surname matches as revealed by Y-DNA STR testing are revealed in **Figure 1**.

67 Marker Matches					
Genetic Distance	Last Name	Earliest Known Ancestor	Y-DNA Haplogroup	Terminal SNP	Match Date
2	Wells	Baker Wells b: c 1775 Mechenburg, Co., VA	E-M35		3/5/2015
2	Wells	William Wells, b.c. 1702, Prince Georges Co., VA	E-V13	V13	12/31/2008
3	Wells	Thomas Hutchinson Wells b 1793 and d 1865	E-M35		6/21/2017
3	Thompson		E-M35		6/21/2017
3	Wells	Thomas C. Wells, b. 1793 and d. after 1870	E-M35		4/28/2015
3	Hixon	King Edward Hixon, b. 1851 and d. 1942, Mizrahiyim	E-M78	M78	1/26/2012
4	Wells	John Wells, Sr, b 1778 Lawrence Co. AR and d. 1845	E-M35		7/13/2013
4	Wells	John Wells Ar, b.1775 Lawrence Co., AR and d.1845	E-BY4418	BY4418	5/2/2013
6	Volkland Sr.		E-M35		2/8/2018
7	Jones	William Jones B. 1758 and d. 1853	E-M35		8/15/2017
7	Einreinhof		E-M35		3/29/2016
7	Jones		E-M35		4/28/2015
7	Martazan	Gavrill Martazan (b. 1769 - ), Ocnitza, Bessarabia	E-V13	V13	4/12/2010
7	Fiest	Jacobus Feist 1724 - 1759	E-V13	V13	2/8/2008
7	Fiest	Jacobus Feist 1724 - 1759	E-M35		10/23/2007

**Figure 1:** Snapshot of test subject McDonald’s closest genetic surname matches at the 67 marker level as revealed in the FTDNA Y-DNA database. The more Y-DNA markers two people share the more recent their shared paternal ancestor once lived. The surnames of the people with whom the test subject shares a common male ancestor are **NOT RANDOM**; he matches many individuals named ‘Wells’ (red arrows) together with other surnames like ‘Jones’ (purple arrows) that also appear as more distant recurring genetic matches. Highlighted font indicates each surnames associated ethnicity; Scottish-associated, Welsh.

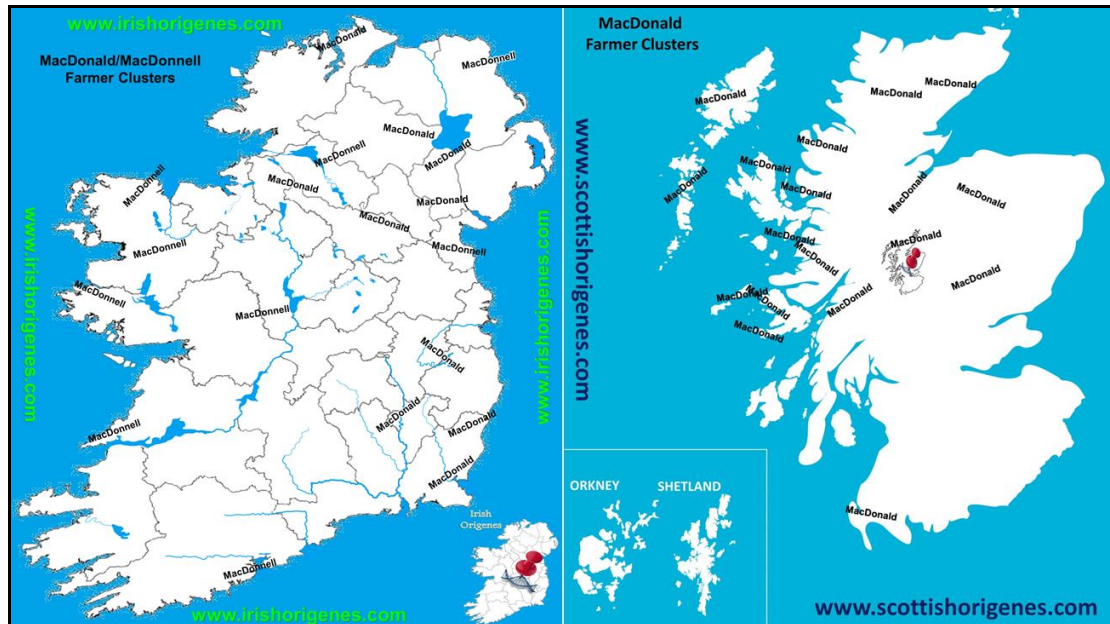
Upon commercial ancestral Y-DNA testing the test subject did not match other individuals named ‘McDonald,’ see **Figure 1**. This indicates that the test subject is not directly descended from a McDonald-Adam; literally the first male (‘Adam’) to take that surname who lived an estimated 1,000 years ago when paternally inherited surnames became common. However, McDonald is a common surname associated overwhelmingly with Scotland, and the presence of Scottish-associated surnames among the test subject’s closest genetic relatives supports a paternal ancestral origin within Scotland, see **Figure 1**. It is Mr McDonald’s closest genetic surname matches revealed by his Y-DNA test results, as a snapshot of his medieval male ancestors neighbours, which can be used to pinpoint where his paternal ancestors once lived. This is because those surnames will have arisen among a group of related males living in a very specific location within Scotland, plot where those surnames occur in early census data and one should reveal an area that is common to all.

### The McDonald Surname

Since surnames arose in an agrarian society, and given that farmers with each surname could still be found concentrated in the area where their surname first appeared, one can examine where farmers named McDonald occur in early census data and determine how many distinct McDonald Clans existed. Early census data reveals at least 40 distinct groups of McDonald farmers found in Scotland and Ireland; indicating the existence of potentially 40 genetically distinct groups that have given rise to the McDonald surname, see **Figure 2**. Since the test subject carries the McDonald surname, his paternal ancestry can potentially be linked to one of the

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estimated 40 distinct locations throughout Scotland and Ireland that are associated with that surname.



**Figure 2:** McDonald farming communities. An examination of the distribution of farmers named McDonald in early census data reveals 40 distinct clusters or groups and hence potentially 40 groups of genetically distinct McDonald clans; each potentially founded by an unrelated Adam. Since the test subject carries the McDonald surname his paternal ancestry is potentially connected to one of these 40 groups. Each surname has been placed on the map in the area where farmers with that surname concentrate in early census data. The most common spelling is detailed in each location.

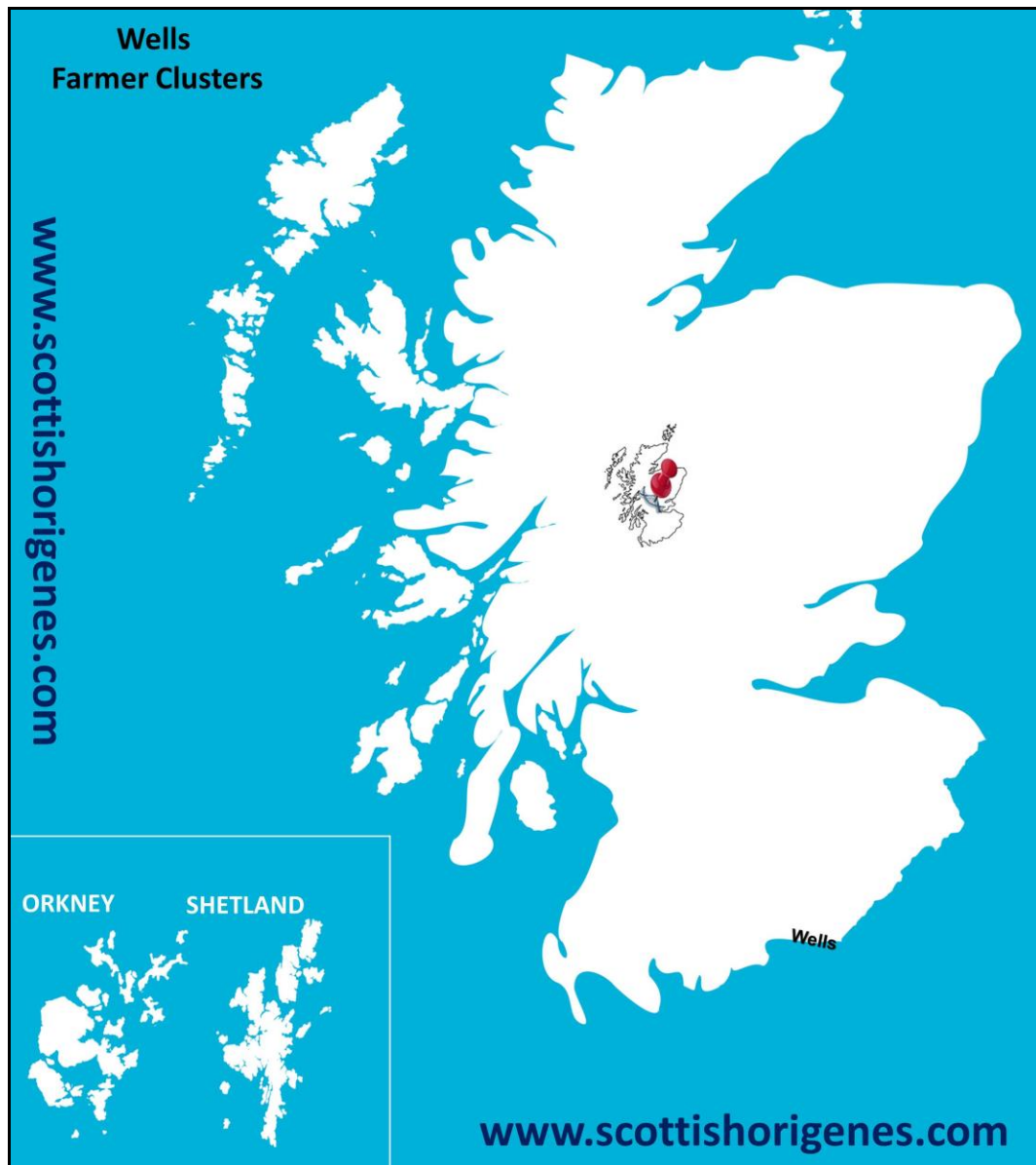
### Pinpointing the Scottish Paternal Ancestral Genetic Homeland

The method of using genetic surname matches as revealed by commercial ancestral Y-DNA testing to pinpoint a paternal ancestral genetic homeland works by exploiting the link between the Y chromosome, surname and land; which are typically passed from father to son through the generations. In the absence of a link to the land the process becomes more challenging. The link with the land is greatest among the farming community and since farmers in Scotland and Ireland can still be found farming the land where their ancestor lived when he first inherited his surname, or where one's ancestor first settled within Scotland and Ireland, one can plot where farmers with the surnames that appear in one's Y-DNA results cluster, and identify an area common to all. This means, for example, that upon Y-DNA testing a McDonald from Argyllshire will be a genetic match to people with Scottish surnames like Campbell, MacFarlane and Buchanan; surnames associated with Western Scotland. In contrast, a McDonald from Donegal will have genetic matches to people named Doherty, McGee and McLaughlin; surnames associated with Northwest Ireland. Hence, it is the test subject's closest genetic surname matches which will reveal where his paternal ancestors originated within Scotland.

An examination of Mr McDonald's Y-DNA results reveals that they are dominated by individuals named 'Wells,' see **Figure 1**. Distribution mapping of Scottish farmers named 'Wells' reveals that they ONLY occur together within Southern Scotland close to the English border, see **Figure 3**. The Scottish Origenes Surnames and DNA Map of Scotland details where farmers with each surname concentrated in early census

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data, and an examination of Dumfriesshire as it appears that map reveals the Wells farming community concentrated between Dumfries town and the English border, together with the 'Thompson' surname which appears as close singular genetic match to the test subject, see **Figures 1** and **4**. Dumfriesshire is notable, as it was an area of Scotland that was colonised by the Romans, who left evidence of their presence in its history, monuments, surnames and in the 'exotic' Y-DNA markers (like the test subject's E-M35) found within the local population, see **Figures 1** and **4**.

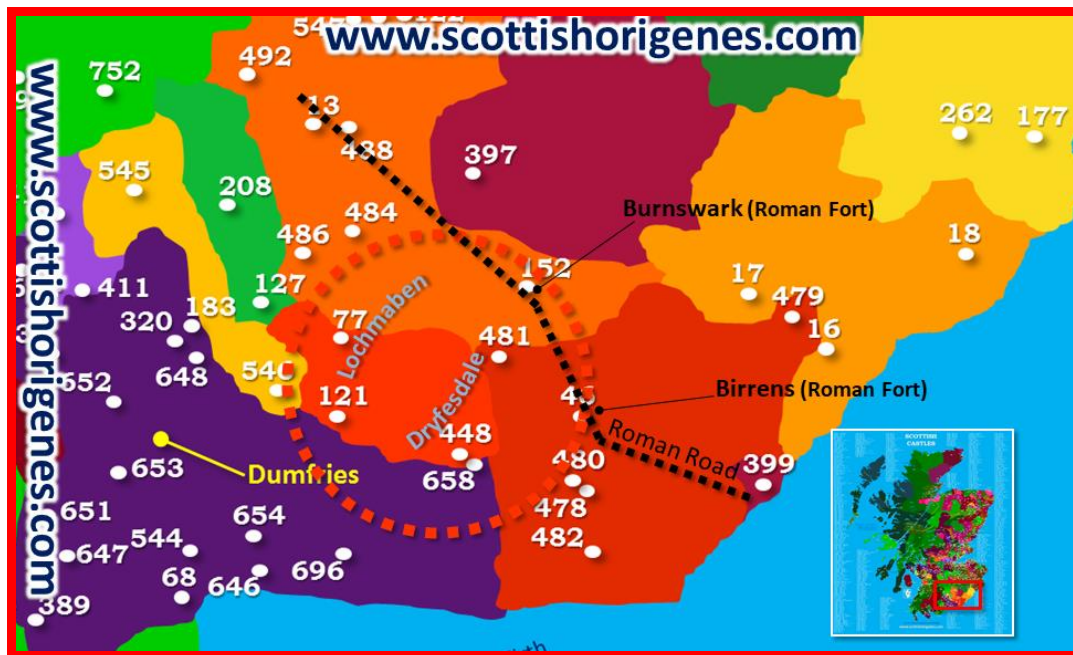


**Figure 3:** The Scottish 'Wells' farming community. An examination of the distribution of farmers named Wells in early census data reveals a single distinct cluster and hence a solitary genetically distinct Scottish Wells clan. The 'Wells' surname dominates the test subject's Y-DNA matches which indicates that his paternal origin is most closely linked with that surname. Each surname has been placed on the map in the area where farmers with that surname concentrate in early census data. The most common spelling is detailed in each location.





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**Figure 5:** Mr McDonald's Scottish Paternal Ancestral Genetic Homeland. The 'Wells' surname dominates the test subject's Y-DNA matches, and an examination of early census data reveals that the Scottish Wells community concentrates in the parishes of Lochmaben and Dryfesdale that lie between Dumfries town and the English border, and it is there that the test subject's Scottish Paternal Ancestral Genetic Homeland (orange broken circle) is to be found. It was there that his paternal ancestor lived when surnames first appeared in Scotland. His ancestor lived surrounded by relatives who inherited other surnames like Thompson and Roman. An examination of the surrounding area reveals a Roman road and two Roman forts; evidence of permanent Roman colonisation of this area.



**Figure 6:** Roman Forts in Dumfriesshire. At Burnswark and Birrens one finds the remains of Roman forts. Although the Roman presence in Scotland was short lived, the presence of exotic Y-DNA Haplogroups in Dumfriesshire is strong evidence that the Roman legions left evidence of their settlement in the local population.

## AUTOSOMAL DNA TEST RESULTS

There are a number of commercial ancestral DNA tests that can be used to explore one's ancestry. By far the most popular is the 'autosomal test' which sheds light over **all** of one's recent ancestral lines. With autosomal DNA testing one will typically match many individuals (both male and female) and making sense of those relationships can be quite challenging. However, as with every DNA test the same golden rule applies; the more DNA that two people share the more recent their shared (paternal or maternal) ancestor once lived. In addition, many of one's autosomal matches will reveal surnames and placenames associated with their family tree, and those surnames and locations can hold clues as to where the various branches in one's own ancestral tree originated. The challenge of modern autosomal DNA test analysis is linking a common location revealed in the DNA test results with a particular ancestral surname.

## INTERPRETING THE AUTOSOMAL RESULTS

An examination of Mr McDonald's FTDNA Family Finder 'autosomal' DNA test results revealed 4,820 genetic relatives, 2,021 of whom record details of their ancestral surnames or locations, see **Figure 1**. What is quite striking is that the locations revealed by the test subject's 'autosomal' genetic relatives are **NOT RANDOM**; given their respective population sizes, Ireland and Scotland feature particularly prominently, see **Figure 7**.

**A**

FamilyFinder STATS	
Matches	4820
Ancestral details	2021
Percentage	42

**B**

Country	Frequency	Percentage
Ireland	258	12.8
Scotland	186	9.2
England	209	10.3
Wales	90	4.5
Germany	174	8.6
France	100	4.9
Spain	11	0.5
Italy	23	1.1
Norway	18	0.9
Poland	17	0.8
Finland	18	0.9
Russia	33	1.6

**Figure 7:** Family Finder Stats. Approximately 42% of the test subject's Family Finder matches record some sort of ancestral information (surname and location, **panel A**). The locations revealed by those genetic relatives are **NOT RANDOM**, compared to a selected number of European countries, **Ireland**, and **Scotland** feature prominently, **panel B**.

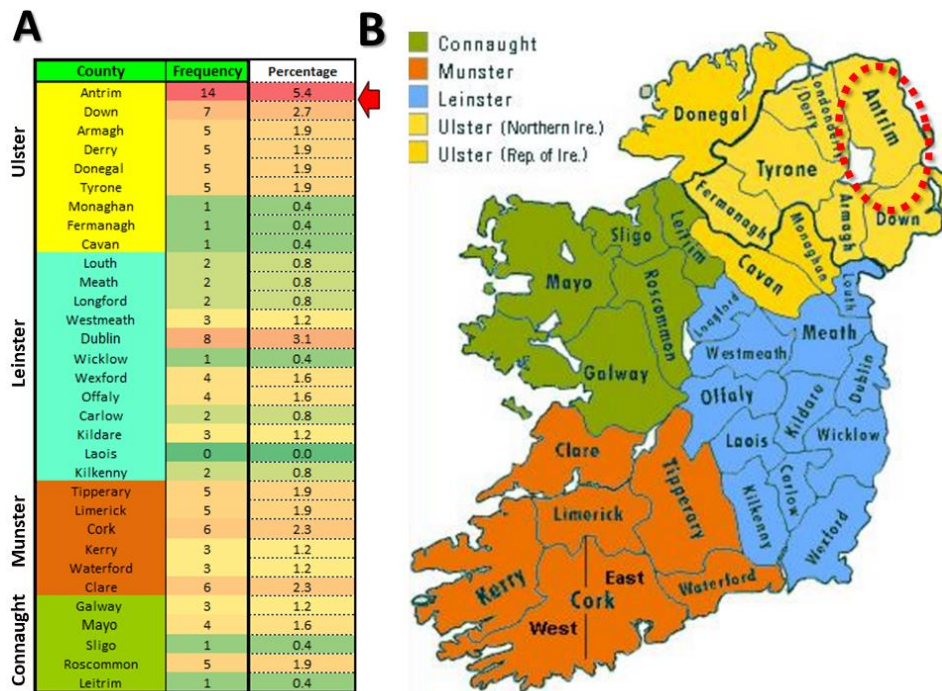
## Irish and Scottish Autosomal Matches

Ireland is divided into 32 counties, and an examination of the Irish counties revealed among the test subject's genetic relatives revealed a solitary ancestral link with Counties Antrim and Down in Ulster in Northern Ireland, see **Figure 8**. An examination of the ancestral surnames revealed by the test subject's genetic



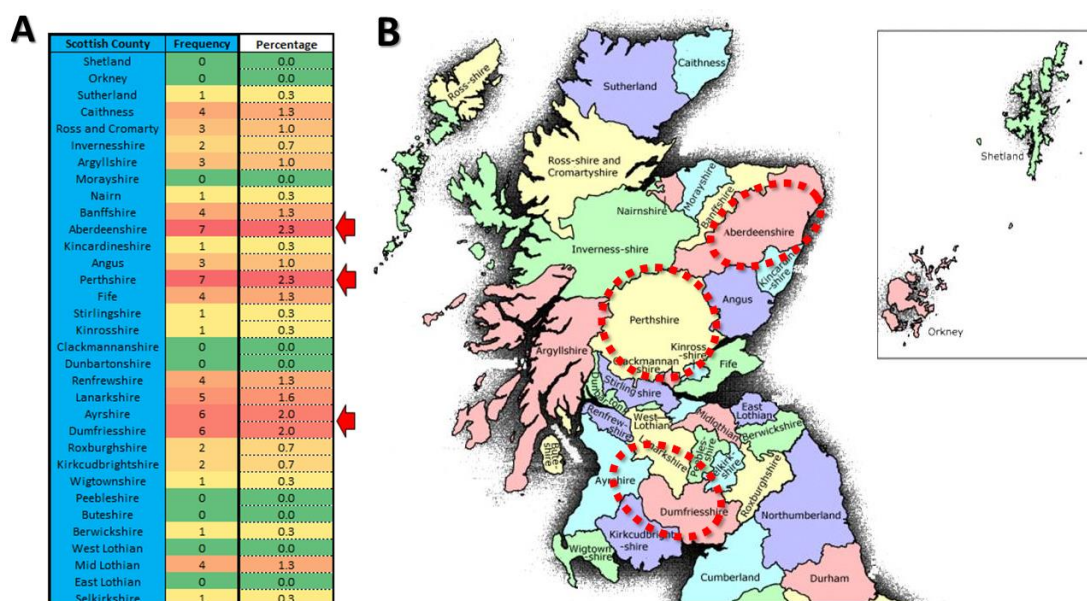
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relatives with recorded links within Ulster reveals that they are dominated by surnames of 16<sup>th</sup> and 17<sup>th</sup> Century Scottish Plantation origin. An examination of the 1841 Scottish counties listed among the detail of the test subject’s autosomal DNA matches revealed signals within Aberdeenshire in the northeast, Perthshire in the Highlands, and the borderlands of Ayrshire and Dumfriesshire in Southwest Scotland, see **Figure 9**. The vast majority of the Lowland Scots that settled within Ulster in the early 1600’s originated from areas like the borderlands of Ayrshire and Dumfriesshire; and it is the test subject’s ancestral connections with Southwest Scotland that accounts for his ‘Irish autosomal’ DNA results.



**Figure 8:** Autosomal matches reveal ancestral connections to Northeast Ireland. The ancestral locations revealed by the test subject’s genetic relatives with recorded ancestral links within Ireland are **not random**, and a search of the Irish counties revealed by the test subject’s genetic relatives (**panel A**) reveals ancestral connections to Counties Antrim and Down in Ulster in Northern Ireland (**red arrow panel A** and **red broken circle panel B**). Closer inspection of the ancestral surnames revealed among the test subject’s genetic relatives reveals that they are dominated by Scottish Plantation surnames.

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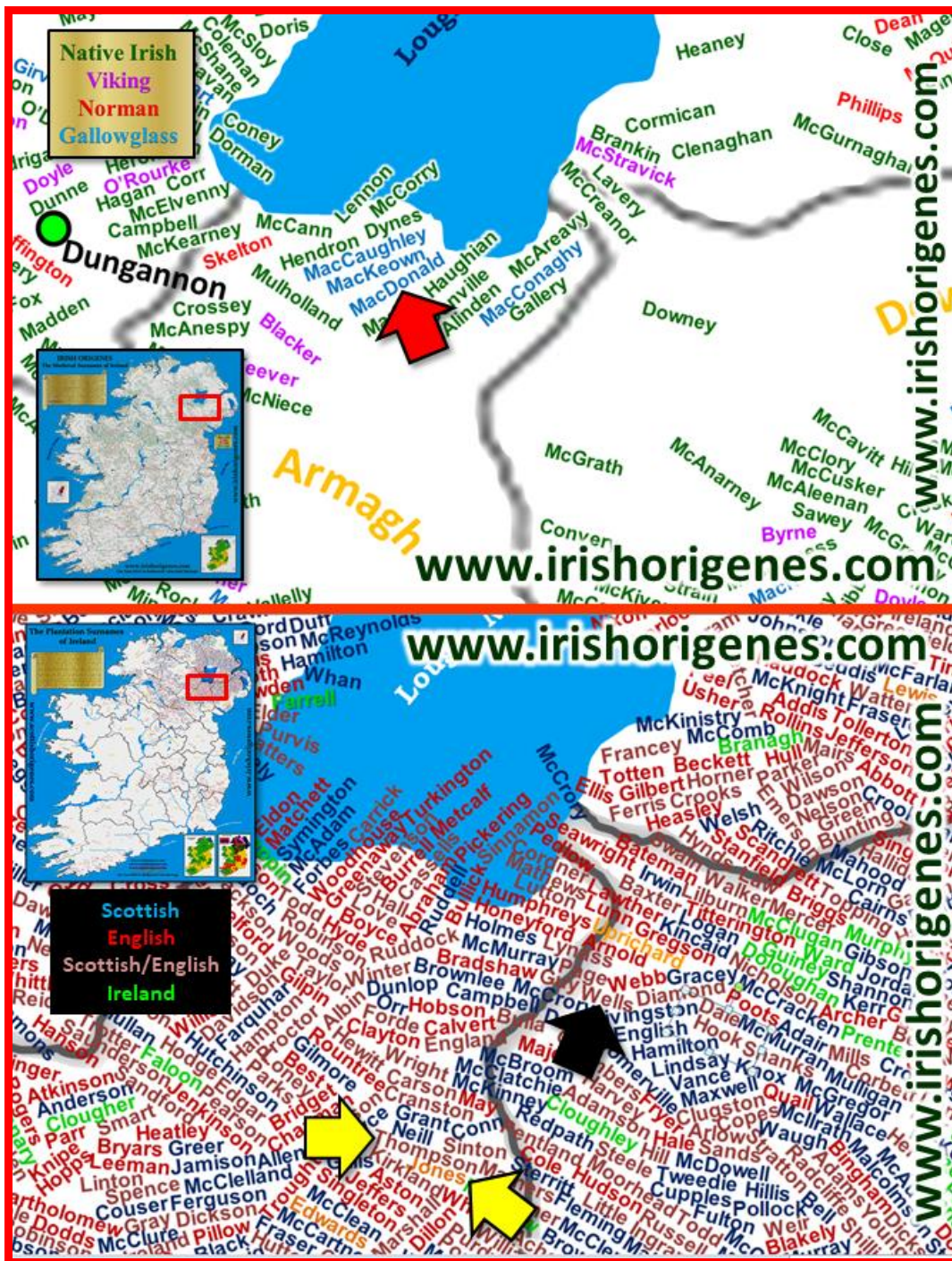
**Figure 9:** Autosomal matches reveal ancestral connections to three distinct Scottish locations. The ancestral locations revealed by the test subject's genetic relatives with recorded ancestral links within Scotland are **not random**, and a search of the 1841 Scottish counties detailed by the test subject's genetic relatives (**panel A**) revealed ancestral links to Aberdeenshire in the northeast, Perthshire in the Highlands, and the borderlands of Ayrshire and Dumfriesshire in Southwest Scotland (**red arrows panel A** and **red broken circles panel B**). The vast majority of the Scots who were 'Planted' (settled) in Ulster in the early 1600's came from areas of Lowland Southern Scotland like the borderlands of Ayrshire and Dumfriesshire.

### ACQUIRING THE MCDONALD SURNAME

While autosomal DNA testing confirmed an ancestral link with Southern Scotland, there was an amplified signal from Southern Antrim and bordering County Down in Northeast Ireland; which the test subject's DNA reveals is the result of early 17<sup>th</sup> Century settlement by Lowland Scots from areas like Dumfriesshire. Strikingly, an examination of the surnames of the Antrim, Down and Armagh borderlands reveals the Gallowglass MacDonald and Planter Wells, Thompson and Jones surnames, see **Figure 10**. Remarkably, the close genetically Y-DNA matching McDonald, Wells, Thompson and Jones surnames are all found together within the farming community that occupies a very small geographical area of the Armagh and Down borderlands, see **Figure 10**. These results indicate that a 'non-paternal' event occurred in the North Armagh and Down borderlands that resulted in his Lowlander Scottish 'Wells' paternal ancestor acquiring the Gallowglass Highland Scottish 'MacDonald' surname. The mercenary MacDonalds of North Armagh were in turn descendants of the MacDonnells of the Glens of Antrim.



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**Figure 10:** The Surnames of the Antrim, Down and Armagh borderlands. South Antrim and North Down emerged as the test subject's solitary Irish autosomal DNA hotspot. Strikingly, an examination of the Medieval (**top panel**) and Plantation (**bottom panel**) surnames of the Antrim, Down and Armagh borderlands reveals the test subject's MacDonal surname (**red arrow, top panel**) together with the Wells surname that dominated his Y-DNA matches (**black arrow, bottom panel**) and the Thompson and Jones surnames that also appear as close (**yellow arrows**) genetic matches. The Y-DNA test results indicate that the MacDonal surname was acquired by the test subject's paternal ancestor in the northern borderlands of Armagh and Down at some point after 1600AD. Each surname is positioned in the location where farmers with each surname concentrate in early census data.

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### **How to confirm the McDonald Paternal Ancestral Genetic Homeland**

One must remember that this is a scientific DNA approach to pinpointing a paternal origin. As such, confirmation that the test subject's paternal ancestors were from Dumfriesshire will require the recruitment of Wells farmers from that area for commercial ancestral Y-DNA testing. Confirmation that his paternal ancestor acquired the McDonald surname in Ireland will require the recruitment of farmers with that surname from the borderlands of North Armagh and neighbouring Down.

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