

# Robinson BigY DNA Case Study

A Scottish Case Study

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A handwritten signature in black ink, appearing to read 'Tyrone Bowes'.

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## BigY Analysis

The Y-DNA111 marker test explores STR mutations, which as repetitive sequences of DNA are far more susceptible to variation. In contrast, the BigY test explores far more permanent mutations known as SNPs. As a result, the differences between the genetic matches in both tests can sometimes be quite striking. However, as with all commercial ancestral DNA test results, ones genetic matches are *NOT RANDOM*, and as a rule the more DNA that two people share the more recent their shared ancestor once lived.

Similar to his Y-DNA STR results, the test subject's closest BigY genetic matches were dominated by a Scottish-associated surnames, see **Figure 1**. His BigY genetic matches are *NOT RANDOM* with approximately 50% of his BigY genetic relatives having surnames which recur among his results. A closer inspection revealed that the test subject's closest BigY matches are dominated by the exclusively Scottish surnames; Stewart, McCoy (a variant of 'MacKay' found beyond Scottish shores), MacDonald and MacFarlane; the closest of whom differ in a single SNP mutation; either CTS3850, PF682 or Y783.2, see **Figure 1**.

BigY Matches						
Match Surname	Shared Novel Variants	Known SNP Difference	Non Matching Known SNPs	Matching SNPs	Sequence	Frequency
Robinson	20	1	PF682	26358	1	2
McWhannell	16	1	Y783.2	26356	2	1
Stewart	16	1	CTS3850	26460	3	6
Pierce	16	1	CTS3850	26135	4	1
McCoy	16	1	CTS3850	26128	5	5
Colburn	16	1	Y783.2	26435	6	1
Gillis	12	1	CTS3850	26271	7	1
McDonald	0	1	CTS3850	26366	8	6
MacDonald	0	1	CTS3850	25389	9	6
Pilkington	0	1	CTS3850	26327	10	1
MacFarlane	0	1	CTS3850	26438	11	3
MacDonald	0	1	CTS3850	24954	12	6
MacDonald	0	1	CTS3850	25458	13	6
McCoy	0	1	CTS3850	26068	14	5
Stewart	0	1	CTS3850	25213	15	6
MacPherson	16	2	CTS3850 Y783.2	26322	16	6
Griffiths	16	2	CTS3850 Y783.2	26143	17	1
McKay	16	2	CTS3850 PF1557	26335	18	5
Livingston	16	2	CTS3850 Y783.2	26390	19	1
Baker	16	2	CTS3850 Y783.2	26467	20	1
Woodruff	16	2	CTS3850 Y783.2	26198	21	1
McMillan	16	2	CTS3850 Y783.2	25919	22	4
McRae	16	2	CTS3850 Y783.2	26429	23	5
Moore	16	2	CTS3850 Y783.2	26348	24	1
Bohannon	16	2	CTS3850 Y783.2	26386	25	19

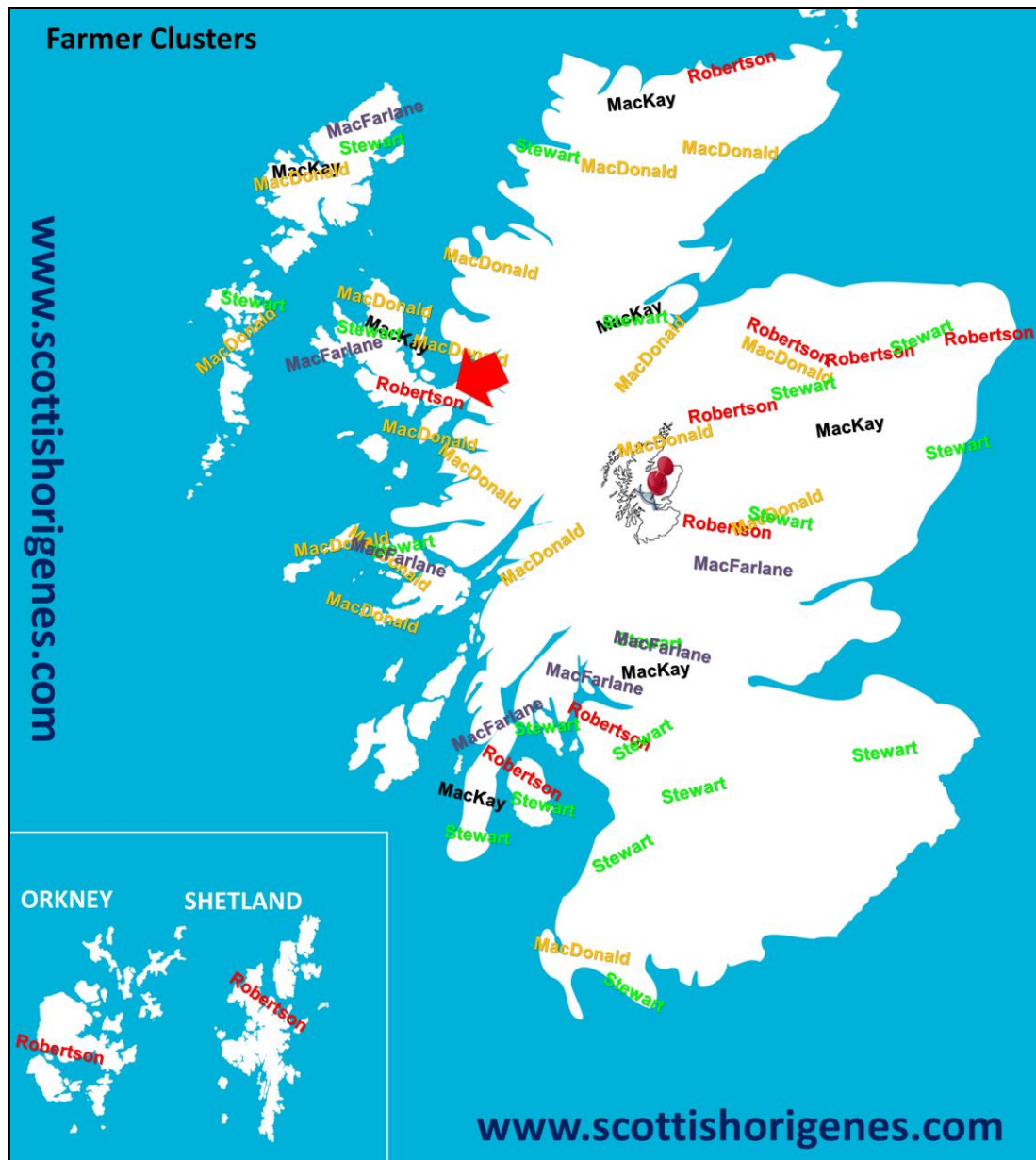
**Figure 1:** Snapshot of Mr Robinson's closest BigY genetic matches. The test subject's closest BigY genetic matches are *NOT RANDOM*, they are dominated by Scottish surnames, with approximately 50% of the individuals that appear among the test subject's BigY matches having surnames which recur among his genetic relatives. The frequency panel (far right) details the number of individuals with each surname who appear among the test subject's BigY matches, for example there were 6 Stewarts and 5 McCoy who appear throughout his BigY results. The test subject's closest BigY genetic relatives differ only in a single mutation, either CTS3850, PF682 or Y783.2.

### Pinpointing an Ancestral Origin using BigY Matches

The method of using genetic surname matches as revealed by commercial ancestral Y-DNA testing to identify a geographical origin 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 amongst the farming community and since farmers in Scotland 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, one can plot where farmers with the surnames that appear as one's closest Y-DNA genetic matches concentrate, and identify an area common to all. Using this methodology, previous reporting on the test subject's Y-DNA STR results pinpointed an origin for the test subject's direct male ancestor within the Trossachs region of West Central Scotland approximately 1,000 years ago. It also revealed tentative clues which suggested a more recent migration, and hence a potential ancestral link beyond West Central Scotland.

An examination of Mr Robinson's *BigY* results reveals that the surnames Stewart, MacKay (McCoy), MacDonald and MacFarlane appear as his closest recurring BigY Scottish surname matches, see **Figure 1**. Distribution mapping of farmers named Robertson (the more common form of 'Robinson' in Scotland), Stewart, MacKay, MacDonald and MacFarlane reveals that they occur together, and in closest proximity to one another on the Isle of Skye in the Western Isles of Scotland, see **Figure 2**. Strikingly, an examination of the test subject's closest Y-DNA 111 STR matches reveals that 3 of his closest MacDonald genetic relatives record earliest known ancestors within Invernesshire, including one individual with a recorded ancestral link with the Isle of Skye, see **Figure 3**. The Scottish Origenes Surnames and DNA Map of Scotland details where farmers with each surname concentrated in early census data, and an examination of the Isle of Skye as it appears on that map reveals the Robertsons in Southern Skye surrounded by the Stewarts, MacKays, MacDonalds and MacFarlanes, see **Figure 4**.

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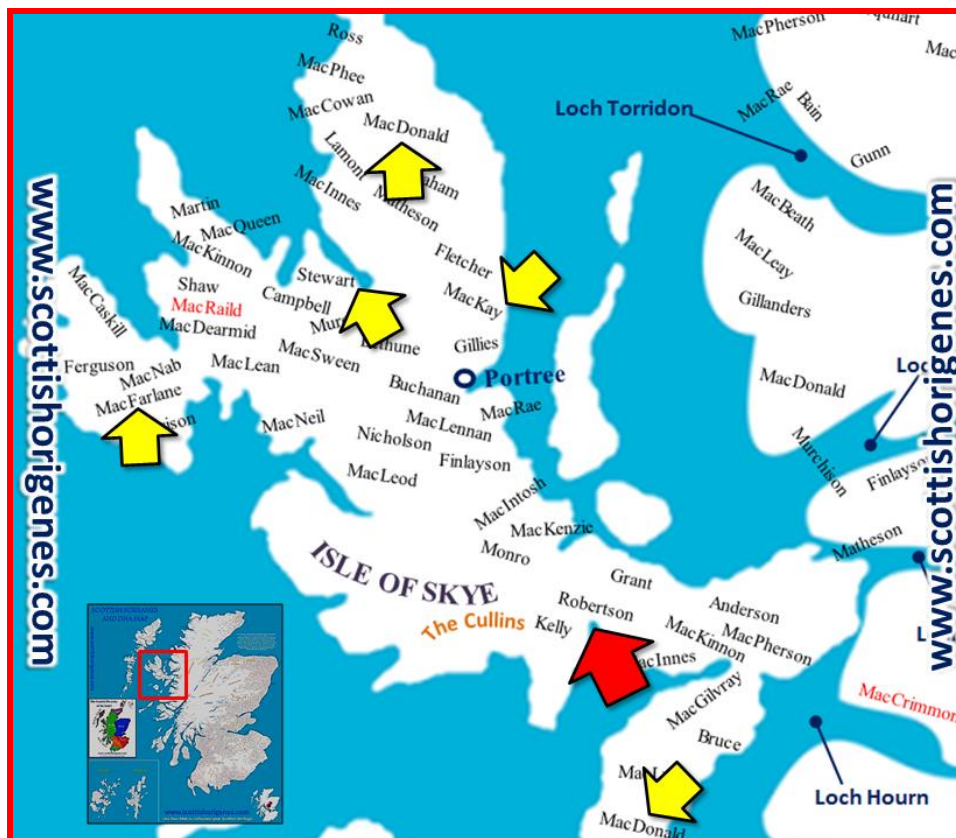


**Figure 2:** The test subject's closest BigY recurring genetic surname matches reveal a paternal ancestral link with the Isle of Skye. The Stewart, MacKay, MacDonald and MacFarlane surnames appear as the test subject's closest BigY recurring genetic matches and an examination of their associated farming communities in early census data reveals that they crucially occur together and in closest proximity to Robertsons on the Isle of Skye in the Western Isles of Scotland (**red arrow**). Each surname has been placed on the map where farmers with that surname concentrated in early census data.

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111 Marker Matches				
Genetic Distance	Surame	Most Distant Ancestor	Y-DNA Haplogroup	Terminal SNP
3	McCoy	Un-identified McCoy, 1800s Pike County, KY	R-BY155	BY155
3	Campbell	Alexander Campbell (1816) of New York and Vermont,	R-M269	
3	McCoy	Richard McCoy, B. 1752 Montgomery County VA	R-BY11787	BY11787
3	McCoy	Crinian, Mormaer of Atholl b. 975 d. 1045	R-A35	A35
3	Roberts	Un-identified McCoy, 1800s Pike County, KY	R-BY155	BY155
3	Campbell	Duncan Campbell 4th of Glenlyon 1576	R-Z16328	Z16328
4	Robinson	James Robinson, b. 1760, d. 1835	R-Z16328	Z16328
5	Campbell	John Campbell (est 1836) of Arrochar, Scotland	R-L1065	L1065
5	Gillis	Roderick Gillis b.1826 d.1906 Nova Scotia	R-BY154	BY154
5	Bissett	Jacob Bissett b. 1786, Maryland USA L1065+	R-Z16328	Z16328
5	McCoy	Richard McCoy, B. 1752 Montgomery County VA	R-BY11787	BY11787
7	McCann Keyser	Laurence McCan, 1730-1819	R-M269	
7	McDonald		R-M269	
7	Mark	Gilbert Mark, 1830-1900	R-M269	
7	MacDonald	Martin MacDonald, 1755 Inverness Shire (S756+)	R-BY154	BY154
8	MacDonell	John MacDonell B.1760 Fort Augustus	R-M269	
8	Stewart	John Fitz Stewart b ca 1787 New Brunswick, Canada	R-FGC10125	FGC10125
8	MacDonald	John MacDonald b1803	R-BY154	BY154
8	Ferguson	Francis Marian Ferguson, 1831 - 1862	R-M269	
8	Macdonald Esq.	Lachlan Macdonald, b1821 Bracadale Isle of Skye	R-M269	
8	Dougall	Robert Dougall, b. 1821 and d. 1858	R-L1065	L1065
8	Baxter	Charles Baxter abt 1816, d. 1896	R-M269	
9	McAusland	Robert McAusland b.1750	R-A9017	A9017
9	Baxter	James Baxter, b. 1820 and d. unk.	R-M269	
9	McPherson	Mr. James McPherson, b. 1795 and d. 1875	R-M269	

**Figure 3:** The test subject's closest Y-DNA STR genetic matches at the 111 marker level. Similar to the test subject's BigY results, the Scottish Stewarts, McCoys and MacDonalds dominate among the test subject's closest STR matches. An examination of the test subject's closest genetic matches at the 111 marker level also revealed multiple individuals named McDonald with recorded ancestral links with Invernesshire (highlighted in blue, 'most distant ancestor' panel) with at least one McDonald recording an earliest known paternal origin within the Isle of Skye.



**Figure 4:** The Surnames of the Isle of Skye. An examination of The Isle of Skye as it appears on the Scottish Origenes Surnames and DNA map revealed Robertson farmers in Southern Skye (red arrow), surrounded by Stewart, MacKay, MacDonald and MacFarlane farming communities (yellow arrows). Each surname is positioned in the location where farmers with each surname concentrate in early census data. Surnames in red font are associated exclusively with a single location within Scotland.

### Putting a Timeframe to the Ancestral link with Southwest Central Scotland

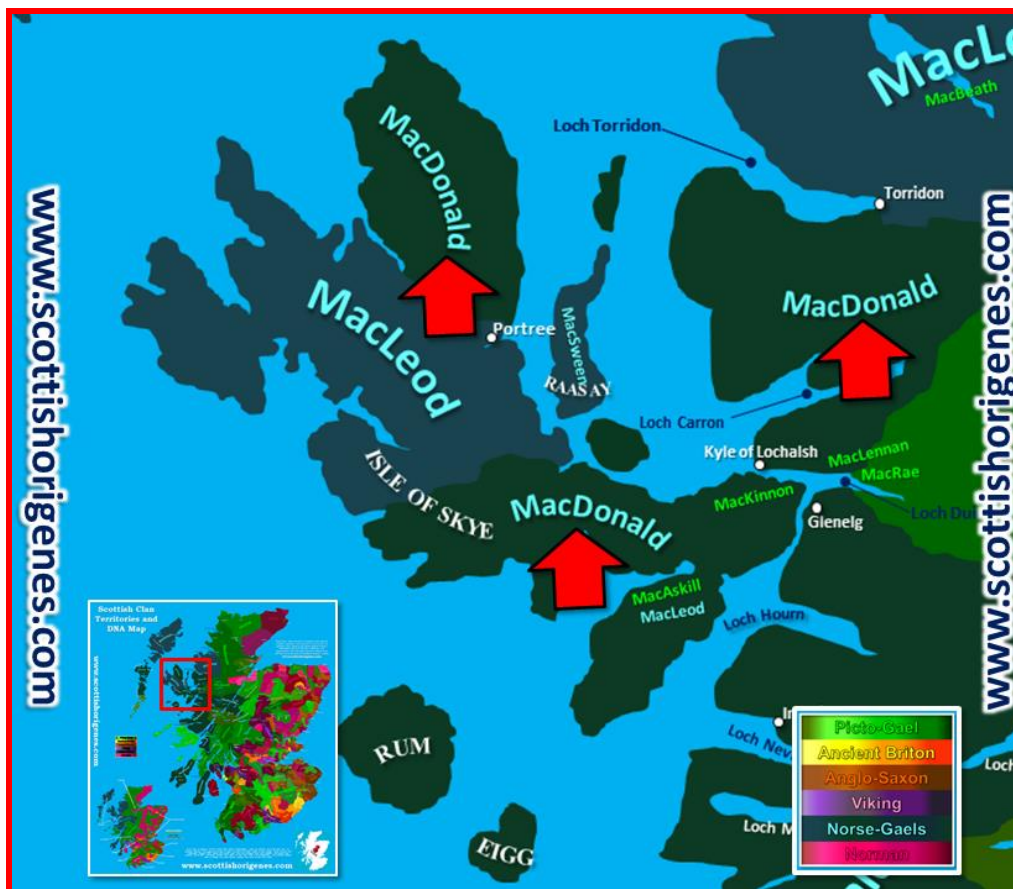
Putting a timepoint to the appearance of each SNPs is problematic. In contrast, research at Scottish Origenes has constructed a timeframe to a shared paternal ancestor based on the shared number of markers at the 111, 67 and 37 Y-DNA STR levels, see **Figure 5**. Since the test subject's 'McAusland' genetic relative has a genetic distance of 9 at the 111 marker level (Figure 4), and since the MacAuslan surname is exclusive to the Loch Lomond area, this would indicate that the test subject's paternal ancestor left West Central Scotland for the Isle of Skye between 1340 and 1415AD; over 300 hundred years *after* surnames first appeared within Scotland, see **Figure 5**.

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Y-DNA111		
Genetic distance	Estimated time to a shared paternal ancestor / years	AD
0	0	-
1	75	1950-2015
2	150	1865-1950
3	225	1790-1865
4	300	1715-1790
5	375	1640-1715
6	450	1565-1640
7	525	1490-1565
8	600	1415-1490
9	675	1340-1415
10	750	1265-1340
11	825	1190-1265
Y-DNA67		
Genetic distance	Estimated time to a shared paternal ancestor/years	AD
0	0-100	1900-
1	100-200	1800-
2	200-300	1700-
3	300-400	1600-
4	400-500	1500-
5	500-600	1400-
6	600-700	1300-
7	700-800	1200-
Y-DNA37		
Genetic distance	Estimated time to a shared paternal ancestor/years	AD
0	0-200	1800-
1	200-400	1600-
2	400-600	1400-
3	600-800	1200-
4	800-1000	1000-
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**Figure 5:** The Scottish Origenes timeframe to a shared paternal ancestor based on the shared number of Y-DNA STR markers. Research at Scottish Origenes has produced a timetable for the estimation of a time to a shared paternal ancestor based on the number of shared markers at the 111, 67 and 37 markers. This research reveals that the test subject paternal ancestral left the Loch Lomond area for the Isle of Skye between 1340AD and 1415AD, 300 years after surnames had first appeared in Scotland.

## The Clan Territories of Southwest Central Scotland

By examining the locations of the castles and towerhouses that are historically associated with a particular surname, it reveals that Medieval Scotland was a patchwork of territories dominated by the most notable Clans and Families. Almost everyone with Scottish paternal ancestry will be genetically related to at least one of these prominent Clans or families that once ruled the area where their ancestors lived. An examination of the castles and towerhouses on the Isle of Skye reveals an area dominated by Clans of Picto-Gael and Norse-Gael origin, see **Figure 6**. The MacDonalDs who dominated this area appear among the test subject's closest Y-DNA matches, see **Figure 6**.



**Figure 6:** The principal Medieval Clans and Families of The Isle of Skye. An examination of the castles and towerhouses of the Isle of Skye reveals an area dominated by the MacDonalDs (red arrows) who appear among the test subject's closest BigY and Y-DNA STR genetic matches.

## Mr Robinson's Paternal Ancestral Link with The Isle of Skye

An examination of early census data reveals that Robertson and Robinson farmers concentrate in the neighbouring parishes of Strath and Sleath in Southern Skye, and it is there that the test subject's paternal ancestors settled approximately 700 years ago, see **Figure 7**. The Robertson surname is not associated with the area that surrounds Loch Lomond; where the test subject's paternal ancestor originated approximately 1,000 years ago (when paternally inherited surnames first appeared in Scotland). In contrast, Robertson is common in the neighbouring parishes of Strath

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and Sleath, which may indicate that the Robertson surname was acquired by the test subject's paternal line on the Isle of Skye at some point within the last 700 years.



**Figure 7:** A Paternal Ancestral link with The Isle of Skye approximately 700 years ago. The 1841 census reveals Robertson farmers in the neighbouring parishes of Strath and Sleath; and it is there that the test subject's paternal ancestor settled approximately 700 years ago (**orange broken circle**). The MacFarlanes and MacDonalds who both appear among the test subject's closest BigY genetic relatives have left evidence of their ancestral connection with this area in the surrounding castles and placenames.

### Ancient Briton or Picts

An examination of the *ancestral locations* revealed by the test subject's closest genetic matches in the Ysearch.org database reveals that they are almost completely dominated by individuals with earliest recorded paternal ancestral links above the Clyde Estuary and the Firth of Forth in Northern Scotland, see **Figure 8**. This indicates that the test subject is descended from the Pictish tribes who inhabited Northern Scotland. The Pict were themselves the descendants of some of the earliest Celtic peoples to inhabit Scotland.



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Last Name	User ID	Origin	Haplogroup	Tested With	Markers Compared	Genetic Distance	Estimated shared markers
Craig	32GWC	East Kilbride, Lanarkshire, Scotland	Unknown	Family Tree DNA	67	4	63
Roberts	XFA7Y	Subsidiary, Scotland	R1b1a2a1a1b4 (tested)	Family Tree DNA	67	4	63
Anderson	H5635	Berwick on Tweed, England	Unknown	Family Tree DNA	67	5	62
Campbell	3ngfg	Glenlogie, Perthshire, Scotland	Unknown	Family Tree DNA	67	5	62
MacDonald	JJ2DE	Airth, Stirlingshire, Scotland	Unknown	Family Tree DNA	67	6	61
MacDonald	FYFSP	Drymen, Scotland	Unknown	Family Tree DNA	67	6	61
Austin	XPQHF	Kent, England	R1b1a2a1a1b4 (tested)	Family Tree DNA	67	6	61
Ferguson	AHV5Y	Kilmadock, Scotland	R1b1 (tested)	Family Tree DNA	67	6	61
Griffin	PSHRS	Kinard West, Kerry, Ireland	Unknown	Family Tree DNA	67	6	61
McDonald	YYSHN	Knoydart, Scotland	R1b1a2*	Family Tree DNA	67	6	61
MacDonald	MUV9C	Riddaroh Knoydart Glengary Scotland, Scotland	R1b (tested)	Family Tree DNA	67	6	61
Goins	4Y7GF	Scotland, Orkney Isles, Scotland	R1b1a (tested)	Family Tree DNA	67	6	61
Anderson	68E6Z	Berwick-upon-Tweed, Northumberland, England	Unknown	Family Tree DNA	66	6	60
Eunson	S6C84	Kirkwall, Orkney Isles, Scotland	Unknown	Family Tree DNA	38	2	36
Grant	JMHAM	Inverness-shire, Scotland	Unknown	Family Tree DNA	37	2	35
MacKenzie	3N8K3	Ross & Cromarty, Scotland	Unknown	Family Tree DNA	37	3	34
Bain	5FYTZ	Shetland Isles, Scotland	Unknown	Family Tree DNA	37	3	34
Sweeney	GEH46	Tipperary, Ireland	R1b (tested)	Family Tree DNA	37	3	34
Rook	VK8E7	armagh, Northern Ireland	Unknown	Family Tree DNA	37	4	33
Campbell	GVJV6	Derry/Londonderry, Northern Ireland	R1b1a2 (tested)	Family Tree DNA	39	6	33
Boyle	BHD27	Donegal, Ireland	R1b1b (tested)	Family Tree DNA	37	4	33
Stirling	VEZ46	Forfar, Angus, Scotland	Unknown	Family Tree DNA	37	4	33
Campbell	BWB7Q	Greenock, Scotland	R1b1a2 (tested)	Family Tree DNA	37	4	33
Hedges	D2M5K	Hanworth, London, Middlesex, England	Unknown	Family Tree DNA	37	4	33
Campbell	VAS54	Killin, Scotland	Unknown	Family Tree DNA	37	4	33
McRae	4BQV2	Kintail, Ross-shire, Scotland	Unknown	Family Tree DNA	37	4	33
Urquhart	JVBYE	Knockbain, Scotland	Unknown	Family Tree DNA	37	4	33
MacGregor	EUQ4Q	Minathort, Orwell Parish, Kinross-shire, Scotland	Unknown	Family Tree DNA	37	4	33
Fox	43Q4A	Whitehaven, Cumberland, England	Unknown	Family Tree DNA	37	4	33
Taylor	EGV6N	Aberdeen, Scotland	Unknown	Family Tree DNA	37	5	32
Bruce	EP3FG	Aberdeenshire, Scotland	Unknown	Family Tree DNA	37	5	32
MacRae	YDGKS	Applecross, Ross-shire, Scotland	R1b1 (tested)	Family Tree DNA	37	5	32
Crawford	HATV4	Argyllshire, Scotland	R1b1a2a1a (tested)	Family Tree DNA	37	5	32
Kincaid	QTYFJ	DONEGAL, Ireland	Unknown	Family Tree DNA	37	5	32
Pattie	ZD82B	Fife-shire, Scotland	R1b1a2 (tested)	Family Tree DNA	37	5	32
Matheson	P8P4Q	Gartmore, Kildonan, Sutherlandshire, Scotland	Unknown	Family Tree DNA	37	5	32
McLennan	52ZJ7	Killin/Kintail, Scotland	Unknown	Family Tree DNA	36	4	32
McLennan	GMMTA	Kintail, WesterRoss, Scotland	Unknown	Family Tree DNA	37	5	32
Fenton	M9S6Z	Perthshire, Scotland	Unknown	Family Tree DNA	37	5	32
Badenoch	3MNQP	Rathwen of, Scotland	Unknown	Family Tree DNA	38	6	32
Winning	TD44H	Renfrewshire, Scotland	R1b1a2 (tested)	Family Tree DNA	37	5	32
MacPherson	B2C5X	Shielfoot, Acharacle, Ardnamurchan, Argyll, Scotland	Unknown	Family Tree DNA	37	5	32
Buchanan	KJYA8	Stirlingshire, Scotland	R1b1a2a1a1b4 (tested)	Family Tree DNA	37	5	32
Paton	H4FM6	Stirlingshire, Scotland	Unknown	Family Tree DNA	37	5	32
MacDonald	TBY8Q	Strathmiglo, Fife-shire, Scotland	Unknown	Family Tree DNA	37	5	32
Scott	8MFRNE	Thaxton, Essex, England	Unknown	Family Tree DNA	37	5	32

**Figure 8:** Snapshot of the test ancestral locations revealed by the test subject’s closest Ysearch genetic relatives. An examination of the ancestral locations recorded by the test subject’s closest Ysearch genetic relatives reveals that they are overwhelmingly **locations that lie above the Clyde Estuary and Firth of Forth in Northern Scotland**. This indicates that the test subject is descended from the Pictish inhabitants of Northern Scotland who in turn were some of the earliest Celtic people to inhabit Scotland.

### How to confirm the Robertson Genetic Homeland

One must keep in mind that this is a scientific ‘DNA’ approach. The DNA does not lie and a simple painless commercial ancestral Y-DNA test of Robertsons who live in the parishes of Strath and Sleath would confirm the paternal ancestral link with that area.