In-depth search advice

Modern science can confirm How to the ancestral link to an area by DNA testing its current inhabitants. Piece together your paper trail and combine that with a fuller understanding of genealogical DNA tests, and genetic you could be on track to find out where your ancestors were living 1,000 years ago, as Dr Tyrone Bowes explains. homeland

commercial ancestral Y-chromosome DNA test will potentially provide you with the names of many hundreds of individuals with whom your share a common male ancestor, but what often confuses people is how you can share common ancestry

Figure 1: Mr Patterson's genetically recurring surname matches. The Y-DNA test examined 67 bits (or markers) on the Y-chromosome and compared these markers to other males who have tested. The more markers you share with another male the more recent their common male ancestor lived.

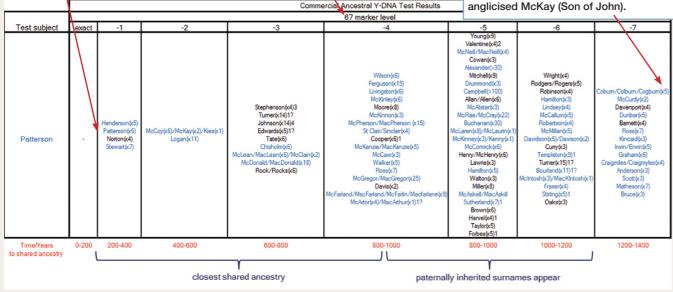
with many individuals with different surnames? The answer is simple. Roughly 1,000 years ago your direct male ancestor, the first for example to call himself 'Paterson', was living in close proximity to others with whom he was related but who took other surnames such as Campbell,

> Each surname appears at the earliest point at which it occurs. For instance, the first match to another Paterson occurs at 66/67 markers but not all Pattersons/ Patersons will match at that level

with each surname that appear as a match. Only surnames that appear greater than three times are shown. Coloured font indicates the ethnicity associated with each surname; blue for Scottish, black font indicates multiple ethnicities. Figures after the brackets denote: 1 Multiple individuals from the same family recruited for Y-DNA testing and excluded

In brackets are the number of individuals

from further analysis. 2 McGregors in disguise (they had to change their surname, when it was banned in 1603). 3 Most matches occur at the 12 marker level and hence the shared ancestry may be coincidental. 4 Johnson may be anglicised McKay (Son of John).



McGregor and Buchanan. In the 1,000 years since nally inherited surnames became common, there will be many descendants of those first Patersons, Campbells and McGregors, some of whom will today take a Y-DNA test. Hence the surnames of your medieval ancestor's neighbours will be revealed in today's Y-DNA test results.

In the UK and Ireland surnames can still be found concentrated in the area where they first appeared. You can therefore use census data to determine the origin of the surnames that appear in your Y-DNA results, identify an area common to all, and reveal what scientists call the 'nal Ancestral Genetic Homeland'. This will be the area where your ancestors lived for hundreds if not thousands of years. It is the area where your ancestor first picked his surname surrounded by relatives who picked others. It is the area where your ancestors left their

mark in its placenames, its history, and in the DNA of its current inhabitants. Modern science can confirm the ancestral link to an area by DNA testing its current inhabitants.

Find your genetic homeland

The first step to identifying your nal ancestral genetic homeland is to identify the surnames that continually appear as genetic matches in your Y-DNA results as these will reflect the surnames of your medieval ancestors' neighbours.

The genetically recurring surnames for a 'Mr Patterson' are shown in Figure 1 (page 18). The Y-DNA test results revealed that Mr Patterson is a genetic match to others called Paterson indicating that he has retained the surname of a 'son-Adam' (the first to take that surname) who lived approximately 1,000 years ago. What the results also reveal is that

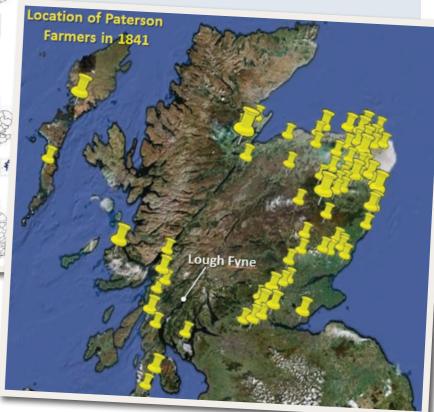
Mr Patterson's genetically recurring surname matches are associated exclusively with Scotland or are found within Scotland (this is not unexpected as Paterson is a Scottish surname). More precisely, though, surname distribution mapping indicates that Paterson is associated with multiple locations within Scotland, which means that 1,000 years ago there were a number of unrelated Paterson-Adams living in various parts of Scotland. However, Mr Patterson's surname matches are to Scottish Highlander surnames, ruling out an ancestral link with Lowlander Patersons (Figure 2).

Identify your surname-'Adam'

So which Highlander Paterson-Adam is the test subject (Mr Patterson) descended from, and where did he live? This can be answered by examining where within northern Scotland Mr Patterson's closest

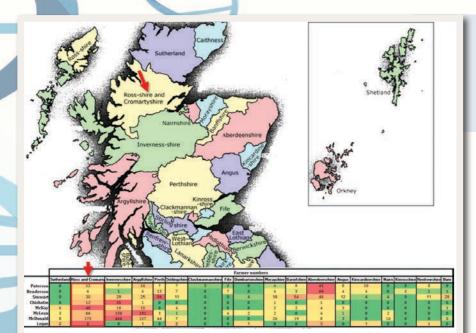
Figure 2: 1881 surname distribution maps reveal a paternal ancestral link with the Scottish Highlands. The Paterson surname is associated with multiple locations indicating multiple Paterson-Adams living in different geographical areas. The predominance of matches to notable Highland surnames rules out an ancestral link to Lowlander Patersons.

Figure 3: The 1841 Paterson farming communities north of the Clyde and the Firth of Forth. Pins have been placed in the parishes where Paterson farmers lived in 1841 revealing multiple origins for the Highlander Patersons. Pin size is indicative of frequency. Clan Paterson folklore records the northern shore of Lough Fyne as their ancestral homeland.



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genetically recurring surname matches were found. Those surnames arose among a group of related males living in a tribal group in a very specific location. So if you plot where those surnames were found you will reveal an area common to all, and hence discover where his particular Paterson-Adam lived. The reason this DNA method of pinpointing your nal geographical origin works so well is that it exploits the link between the Y-chromosome, surname, and land, which are typically passed from father to son through the generations. You must remember that when nally inherited surnames first appeared the majority of the male population were farmers, who passed their land,

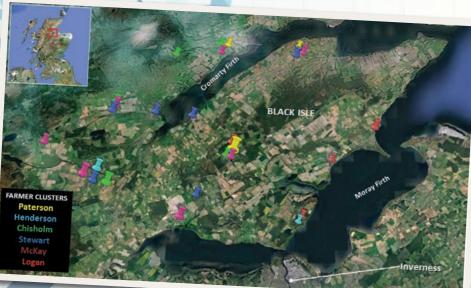


Figure 4: Mr Patterson's closest genetic matches reveal an ancestral link with Ross and Cromarty. In 1841 the farming communities associated with Mr Patterson's closest genetic matches concentrated in Ross and Cromarty (red arrows).

surname, and Y chromosome to their sons. It was not until the industrial revolution that this link with the land was weakened, and even by 1841 you could still find farmers working the lands where their surname first appeared.

Census data reveals many Highlander farmers called Paterson in 1841 and they cluster in groups spread throughout northern Scotland (**Figure 3**, page 19). However farmers called Paterson, Henderson, Stewart, Chisholm, McKay, McLean, Logan and McDonald (the surnames that appear as Mr Patterson's closest genetic matches) are found concentrated in the 1841 County of Ross and Cromarty (Figure 4, page 19). By plotting the parishes where farmers with these surnames were found it reveals that they all cluster together in the area known as the Black Isle, a peninsula just north of the town of Inverness. Paterson farmers are found in their highest density in the parish of Knockbain in the centre of the Black Isle literally surrounded by farming communities with the surnames that appear as Mr Patterson's closest and most frequent genetic matches (Figure 5, below).

Discover your clan connections

The clan system in Scotland has been extensively recorded. Remarkably almost everyone with nal Scottish roots will show common ancestry as revealed by their Y-DNA test result to at least

Figure 5: The farming communities associated with Mr Patterson's closest genetic matches cluster on the Black Isle. Early census data reveals that the Paterson, Henderson, Chisholm, Stewart, McKay and Logan farming communities of Ross and Cromarty were found clustered together on the Black Isle. Pin size is indicative of farmer frequency.

one of the prominent clans or families that dominated the area where their Scottish ancestors originate. Mr Patterson's genetic relatives the MacKenzies, Stewarts, and Chisholms are recorded on, or near, the Black Isle (**Figure 6**, below). Mr Patterson's closest genetic matches reveal an ancestral link with Knockbain on the Black Isle and evidence of his ancestor's long association with that area can also be found in its history, monuments and placenames (Figure 7, bottom). An examination of the area did not reveal Paterson placenames, but there are ones associated with their genetic relatives – in Kilkov (McCoy's church), and various castles including Kinkell, Kilkoy, and Red Castle, which

are associated with the MacKenzies. In addition it is known that Clan Loban (now called Logan) have been associated with Drumderfit on the Black Isle since AD1372 when the clan's founder was the sole survivor of a massacre at the hands of the Frasers and McDonalds. The descendants of the Paterson, Henderson, Stewart, Chisholm, McKay, McLean, Logan and McDonald clans can still be found farming on the Black Isle and a simple

Figure 6: The clans of the Black Isle: Clan Stuart, MacKenzie and Chisholm, which appear as close genetic matches to Mr Patterson's feature prominently on, or close to, the Black Isle. commercial ancestral Y-DNA test can confirm the ancestral link.

Track possible migration routes

The more DNA markers that you share with somebody the more recently your shared male ancestor lived. However, if you explore the distant genetic matches in your DNA results, which reflect earlier shared nal ancestry, the DNA results will often reveal an ancestral link with another location, indicating that an ancestral migration has occurred.

For example a male with British-Viking ancestry may have close genetic matches to surnames originating within, let's say, Yorkshire, while his more distant genetic matches will lead back to an area of Southern Norway from where his Viking ancestors originated. In this manner you can use the Y-DNA results to literally track your nal ancestral journey over many millennia.

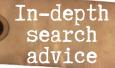
Although Mr son's closest genetic matches demonstrated a nal ancestral link with the Black Isle, the absence of placenames together with the finding that the areas most notable clan, the Logans, have their founding date as late as AD1372 may tentatively indicate that at least some of these clans were relatively recent arrivals. If a migration has occurred then it would be reflected in Mr Patterson's distant Y-DNA results.



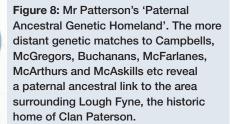
Figure 7: Mr Patterson's ancestral link with the Black Isle. The Patersons cluster (orange broken circle) in Knockbain on the Black Isle in Northern Scotland. They lived surrounded by their genetic relatives the Hendersons, Chisholms, Stewarts, McKays and Logans. Only one putative placename; Kilkoy a possible reference to the McKays/McCoys, can be identified in the surrounding area.



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Home in on your origins

Following the introduction of nally inherited surnames, when you examine the surnames that appear in Mr Patterson's Y-DNA results from this time period (Figure 1) you will notice many matches to surnames associated with the Highlands of Argyllshire. The most prominent clans that appear in Mr Patterson's Y-DNA results from the time when nally inherited surnames became common include the Campbells (>100 individual matches), McGregors (>25), Buchanans (>30), McFarlanes (x9) and McLarens (x9). There are also find some notable surnames such as the McAskills (x3) and McArthurs (x5) - surnames that are exclusively associated with Argyllshire. When you examine the historical evidence for these clans in Argyllshire an interesting discovery is made! They are all found in the lands surrounding the northern shore of Lough Fyne, placing Mr Patterson's nal ancestral genetic homeland at the historical centre of Clan son (Figure 8, above).

Mr son's Y-DNA results demonstrate that when surnames became common in the 9th century AD his son-Adam lived on the northern shore of Lough Fyne. His son-Adam lived surrounded by relatives who became the Campbells, McGregors, Buchanans etc of the Scottish Highlands. At some point between AD1200 and AD1400 his ancestors migrated north to the Black Isle where

some became Logans, MacKenzies and Chisholms.

The Scots today are the descendants of a diverse mix of Picts, Scots (Irish-Gaels), Britons, Anglo-Saxons, Normans, Vikings and even Romans. Amazingly the Y-DNA results can reveal which of these ethnic groups your Scots ancestors descend from. A striking feature of Mr Patterson's Y-DNA results is the overwhelming presence of Scottish surnames throughout his genetic matches. There are very few matches to Irish, English, Welsh, Scandinavian, or indeed mainland European surnames – which would indicate Gaelic/Scots, Anglo-Saxon, ancient Briton, Viking, Norman or Roman ancestry respectively. The exclusive Scottish nature of his genetically recurring surname matches and their overwhelming association with the area north of the Clyde and the Firth of Forth indicate that Mr son is descended from the ancient Picts who were themselves the descendants of some the earliest people to colonise Scotland.

About the author

Dr Tyrone Bowes realised that his ancestral DNA test results could be used to pinpoint precisely where his direct male ancestor lived when he first picked his surname some 1,000 years ago. He now runs



IrishOrigenes.com, EnglishOrigenes.com and ScottishOrigenes.com to show others how to use ancestral DNA test results to pinpoint their own origins.