

# Pettypool Y-DNA Project Update

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The number of participants in the Pettypool Y-DNA Project continues to grow steadily, although more slowly than immediately after its inception in 2007. Recall that Y-DNA is the kind that is inherited exclusively through the male line and is used to match Project members with men who share a common direct paternal ancestor. My review of the data available to date indicates the need for more (male) participants in order to identify Y-DNA markers for family branches springing from the fourth generation Pettypool males. Branch markers could be a valuable aid in constructing one's family tree.

From 2007 through 2011, seventeen men joined the Y-DNA portion of the Pettypool DNA Project. Since 2011 six men have joined. It appears that the rapid increase of interest in autosomal DNA testing beginning about 2011 may account for some of the decline of interest in pursuing a Y-DNA test.

The autosomal test, which can be used by both men and women, is both widely available and less expensive than the recommended Y-DNA test, and has accounted for the majority of joins to the Pettypool Project in recent years. The autosomal test focuses on the DNA that is inherited from both mother and father and their immediate ancestors and is designed to find living relatives within the last five generations. Results from such a test may help substantiate results concerning paternal ancestry but are not as efficient as use of Y-DNA evidence for questions of surname confirmation.

The current report is an update to my 2010 discussion of the results for the Y-DNA portion of the study first presented here:

<https://www.familytreedna.com/public/Pettypool/default.aspx?section=results>

I will detail more recent findings and conclusions with respect to some of the initial goals of the project. Goals that will be discussed in this report include:

- Confirmation of a tester's match to the ancestral Pettypool DNA signature markers
- Determination of possible private and branch markers for separating known branches of the Pettypool family

## Analytic Techniques

This report continues to make use of Diana Matthiesen's concepts and analytic techniques for Y-DNA markers best explained here:

<http://dgmweb.net/DNA/General/SignatureMarkers.html>.

As a reminder, Matthiesen's terms and explanations were included in my earlier discussion as follows:

1. **Signature Markers.** These are non-modal marker values shared by everyone in a family. They consistently and, *in combination*, uniquely distinguish a family. Presumably, these are the mutations possessed by the family's progenitor within "genealogical time."
2. **Private Markers.** These markers are unique to one test subject. The mutation has happened in the individual's descent from the family progenitor, but we don't know in which generation. As more cousins are tested, private markers will turn into branch markers, unless the mutation occurred in the test individual himself. Because the latter can be the case, it is not irrelevant to test a brother, father, or first cousin. **Anyone with a private marker should test cousins** (*viz.*, a 1st cousin, 2nd cousin, 3rd cousin, etc.) until the location of the mutation is determined.
3. **Branch Markers.** These are marker values shared by two or more members of a family, but not the entire family, in other words, by a branch of the family. Once some one has proven their membership in the family by possessing its signature markers, the branch markers become highly important because these markers most likely represent a shared common ancestor more recent than the family's progenitor. (In some cases, a shared value on a volatile, fast mutating marker may mean the mutation happened more than once in the family; paper genealogy and the testing of cousins can determine which is the case.)<sup>1</sup>

## Confirmation of Pettypool Surname Identity using the Signature Marker Strategy

Currently there are 23 men who have joined the project with relevant 37-marker Y-DNA results, each one with his own personal individual goal. Some men already had documentary (genealogical as opposed to genetic) evidence of Pettypool ancestry, some just had a suspicion of such ancestry while others discovered unsuspected Pettypool ancestry after receiving the test results. In all 23 cases, the results for the men matched the 37-marker "signature" Pettypool profile with fewer than four differences, most with no more than one or two differences.

Thus, with respect to the first goal, Project members have been able to confirm suspected Pettypool ancestry with the basic 37-marker test offered by Family Tree DNA. Among these 37 markers, there exist both *relatively* slowly mutating and *relatively* faster mutating markers. The faster mutating markers are characterized by values that can fluctuate between generations more quickly than do the slower mutating markers. There are 14 faster mutating markers, while the remaining 23 mutate more slowly. This aspect of genetic testing influences the likelihood of meeting the second goal, which will be addressed next.

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<sup>1</sup> "Signature Marker Values': What They Are and How to Use Them" Diana, Goddess of the Hunt – for Ancestors!

(<http://dgmweb.net/DNA/General/SignatureMarkers.html>: accessed 14 Jun 2017).

## Search for Markers to Confirm Branch Identity

Realizing the second goal-that of discovering branch markers- has been somewhat more challenging. In the case of our Pettypool family, the most recent common ancestor for all of us is the 17<sup>th</sup> century English immigrant to Virginia, William Pettypool. For many descendant families, like my own, the currently youngest male descendants are at most ten generations removed from William. In genetic terms, this amount of generational separation is considered quite small.

Unfortunately, the relatively recent existence of our most recent common ancestor has apparently not allowed enough time for the *relatively* slower mutation rate of the more useful markers (*because* of that *relatively* slower mutation rate!) to do its work. As an illustration of some of these interpretation problems for the Pettypool Project see the accompanying table prepared by Jim Poole.

Kit Number	Gen(3)	Gen(4)	DYS390	DYS391	DYS385	DYS439	DYS458	DYS459	DYS449	DYS464	DYS576	DYS570	CDY	DYS438
61963	Seth(3)	John	24	10	11-14	12	17	9-10	29	14-15-16-18	18	17	37-37	12
452271	Seth(3)	John	24	10	11-14	12	17	9-10	29	14-15-16-18	18	17	37-37	12
396976	Seth(3)	Seth	24	11	11-14	11	17	9-10	29	14-15-16-18	18	17	35-37	13
111396	Seth(3)	William	24	11	11-14	12	17	9-10	29	14-15-16-17	17	17	37-37	12
86831	Seth(3)	William	24	11	11-14	12	17	9-10	29	14-15-16-17	18	18	37-37	12
33153	Seth(3)	William	24	11	11-14	12	17	9-10	29	14-15-16-18	18	18	37-37	12
108232	Seth(3)	William	24	11	11-14	12	17	9-10	29	14-15-16-18	18	17	37-37	12
183906	Seth(3)	Seth	24	11	11-14	12	17	9-10	29	14-15-16-18	18	17	37-37	12
186981	Seth(3)	Peter	24	11	11-14	12	17	9-10	29	14-15-16-18	18	17	37-37	12
132306	William(3)	Frederick	23	11	11-14	12	18	9-10	28	14-15-16-17	18	17	37-37	12
198587	William(3)	Stephen	24	11	11-14	12	17	9-10	29	14-15-16-17	18	17	36-37	12
182173	William(3)	Stephen	24	11	11-14	12	17	9-10	29	14-15-16-17	18	17	36-37	12
198586	William(3)	Stephen	24	11	11-14	12	17	9-10	29	14-15-16-17	18	17	36-37	12
426265	William(3)	Stephen	24	11	11-14	12	17	9-10	29	14-15-16-18	18	17	36-37	12
186484	William(3)	Phillip	24	11	11-14	12	17	9-10	29	14-15-16-17	18	17	37-37	12
B1040	William(3)	William(Ephraim)	24	11	11-14	12	17	9-10	29	14-15-16-17	18	18	37-37	12
191876	William(3)	Phillip	24	11	11-14	12	17	9-10	29	14-15-16-17	18	18	37-38	12
152288	William(3)	Phillip	24	11	11-14	12	17	9-9	29	14-15-16-17	18	18	37-37	12
87253	unknown		24	11	11-13	12	17	9-10	29	14-15-16-17	18	17	36-37	12
223902	unknown		24	11	11-14	12	17	9-10	29	14-14-16-17	18	17	37-37	12
303550	unknown		24	11	11-14	12	17	9-10	29	14-15-16-17	18	17	36-37	12
376678	unknown		24	11	11-14	12	17	9-10	29	14-15-16-17	18	17	37-37	12
433838	unknown		24	11	11-14	12	17	9-10	29	14-15-16-17	18	18	37-37	12

This table is a compressed version of the “DNA Colorized Results” table available on the Pettypool FTDNA website at <https://gap.familytreedna.com/ydna-results-colorized.aspx>. The compressed table shows only those 18 markers for which at least one of the participants carries a marker value different from the 37-marker Pettypool “signature.”

The table displays color-coded column labels distinguishing the *relatively* slower mutating (labeled black) from the *relatively* faster mutating markers (labeled red). The rows in the table have been grouped by the major early branches of the Pettypool family, that is descendants of the sons of Seth(3), sons of William(3) and a group with attribution not yet determined. All values for each marker that differ from the Pettypool modal values (and thus represent probable private mutations somewhere down the family tree since the immigrant) are shaded in yellow. Note that, while there are 12 columns, there are 18 markers since some markers are multi-copy markers and thus are collected under one column label. For example, DYS464 represents four versions of the same marker in different locations on the y-chromosome.

As shown by the table values, most of the mutations are present in only one individual Pettypool Project member and thus are considered “private.” However, as noted by Matthiesen, such private mutations are those that can, in the future, turn out to be a branch marker for the particular branch of which the tester is a member. Confirmation of such potential branch markers provides the rationale for continued testing of far-flung branches of the Pettypool family so as to assist those who have lost direct genealogical evidence of their exact relationship to the early family ancestors.

As should probably be expected because of their volatility, all but one of the faster-mutating markers (DYS385a-b, DYS439, DYS458, DYS449, DYS464a-d, DYS576, DYS570, and CDYa-b) in the 37-marker panel are represented among the markers showing differences for the current sample of Pettypool descendants. Although extra caution must be used in interpreting results for these markers, differences on these markers cannot be totally discounted. For example, in my earlier report of the Y-DNA results, I pointed out the possibility of a recurring pattern in the DYS464a-d marker as a potential branch marker separating Seth(3) from William(3) descendants.

The updated results continue “generally” to show such a pattern. Among the nine known Seth(3) branch descendants, seven (77%) show the pattern 14-15-16-18 for DYS464a-d. Among the William(3) branch descendants, eight of nine (88%) show the pattern 14-15-16-17.

What might we say about the three individuals (kits 11396, 86831 in the Seth(3) sub-group and kit 426265 in the William (3) sub-group) with a DYS464a-d pattern opposite that of their documentary-confirmed branch placement? Because of their

infrequency within each documented branch, I would argue that the disrupted patterns among the three men for this known volatile marker are the result of “back” mutations, or changes “back” away from the currently modal pattern within each group.

Another fast mutating marker that may also turn out to be relevant for branch identification is DYSCDYa-b. Note that the group of participants associated with William(3) contains a smaller sub-group (kits 198586, 198587, 182173, and 426265) who all show a DYSCDYa-b value of 36-37 as compared to the Pettypool modal value of 37-37. These men also are all men for whom documentary evidence points to ancestry via William(3)'s son, Stephen(4).

Among the more slowly mutating and therefore more reliable markers for distinguishing family branches, one marker has been discovered that definitely appears to validly distinguish one sub-branch among the Seth(3) descendants. Both men with a value of 10 rather than the signature Pettypool family value of 11 for the marker DYS391 (kits 61963 and 452271) are known via documentary evidence to be descendants of John(4), the eldest son of Seth(3).

At the moment these two men appear to be the only descendants of John(4) in the Project. Coincidentally, both also are descended from the same great-grandson of John(4). As a consequence of their even more recently shared ancestor, it is not now possible to know whether the distinctive value on the DYS391 marker is associated only with the line of the great-grandson or is possibly indicative of a branch even further back in the ancestral Seth(3) pedigree.

Only contributions from testers representing branches descended from John(4)'s other sons and grandsons will allow us to fully trace any descendant branches potentially harboring this and other relevant distinguishing mutations. What we can say is that anyone with an unknown paper pedigree obtaining a value of 10 on marker DYS391 which is part of the otherwise distinctive Pettypool genetic signature profile would prompt a search for descent among the John(4) sub-branch of the Seth(3) group.

## **Conclusions**

For the relatively fast-mutating markers in the FTDNA 37-marker panel, the addition of several more testers with known Pettypool ancestry will help determine whether the present patterns show sufficient stability to warrant their continued use as predictive branch markers for men without the paper trail.

One sub-branch of Seth(3)'s descendants appears to have been definitively characterized genetically with one of the more slowly mutating markers. Substantially more testers are needed from other branches in order to probe for the presence of additional slow-mutating markers that could serve as reliable signals for other as yet untested Pettypool family sub-branches.

Currently, each of Seth(3)'s four known sons (John, Seth, Peter, and William) is represented by at least one tester who has joined the Project. Such is not the case for the sons of William(3), of which there are at least five men who are well-documented sons (William, Stephen, Phillip, Ephraim, Seth) and three who are probably sons (Abraham, Frederick and John). Only four of these eight likely sons of William(3) are currently represented by Y-DNA Project testers.

If you know or strongly suspect that you are descended from *any* one of these fourth generation Pettypool men, please consider joining the Project yourself if you are a male or sponsoring a male relative if you are a female. We would be pleased to answer any questions you might have about these findings or about joining the Project.