Genetic Genealogy – A Polish-American Perspective of Y-DNA Testing

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Genetic genealogy has recently been promoted as an exciting tool for the amateur and professional genealogist to break down brick walls and reveal ancestral information. Articles are now commonplace among genealogical magazines and websites and provide some insight into DNA testing (Taylor 2006, Fitzpatrick and Yeiser 2006, Shreeve 2006a-b). Several DNA testing companies are ready to analyze your DNA and provide you with results that may give clues to ancestral origins including: Family Tree DNA (**www.familytreedna.com**), DNA Heritage (**www.dnaheritage.com**), Oxford Ancestors (**www.oxfordancestors.com**) and Relative Genetics (**www.relativegenetics.com**). A tool, however, is only as good as the skill of the user; and popular articles don't go into much detail.

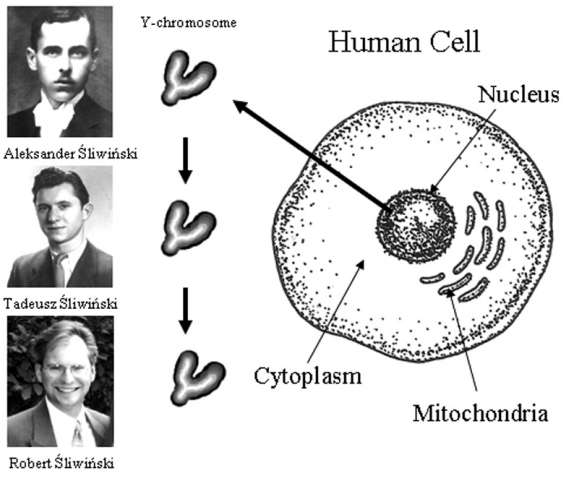
As a professional biologist and amateur genealogist, I decided to have my DNA tested to find out my ancestral roots and potentially find some undiscovered relatives. While I know my parents were from Poland, would the test confirm my Slavic roots? This paper describes the Y-DNA testing process from the customer's point of view, and provides a basic guide for those who wish to try DNA testing and searching Y-DNA databases. My DNA testing experience was enlightening and has inspired and expanded my genealogical research.

Deciding which company to choose is a little overwhelming at first. After a review of each company's website (mentioned above), I searched their surname databases. Only Family Tree DNA (FTDNA) had a "Sliwinski" in their database. Could I be related? I had to find out. I also learned about the Family Tree DNA Polish Project, which provides a group discount on DNA tests to those that join. I contacted the Polish Project co-administrator, Larry Mayka, via e-mail <*lgmayka@ieee.org*>, and he provided some reassurances regarding test selection. However, I recommend evaluating several companies and choosing the right one for your needs. FTDNA suited my needs.

There are several tests available at Family Tree DNA. However, there are two main types of tests: the Y-DNA test (Y Chromosome) and the Mt-DNA test (Mitochondrial DNA). Men can have either DNA type tested; women, however, can only have Mt-DNA tested. Men have an XY chromosome pair that determines their gender, while women have an XX. What's important to know is that the Y-chromosome contains DNA that is passed from father to son and follows the patriarchal line, which is the same line that ordinarily carries the surname. Women who wish to know the genetic patriarchal side of the family should have a male relative take the Y-DNA test.

The Y-DNA test examines the Y-chromosome that is located within the nucleus of a cell. Picture this: when frying an egg you see the white and yolk of the egg. The yolk represents the nucleus (or the "brain" of the cell) and the white, the cytoplasm or remaining portion of the cell (Figure 1).

Figure 1. Heredity of the Y-Chromosome and the Human Cell



Mt-DNA is a different type of DNA. The Mt-DNA test looks at DNA that is located within the cell but outside the nucleus. This DNA is found in the "powerhouse" of the cell called the mitochondria. Their job is to help cells use oxygen to produce energy (Sykes 2001). Unlike the DNA in the chromosomes of the nucleus, which is inherited from both parents, everyone gets their mitochondrial DNA from only one parent – their mother (Sykes 2001).

There are several Y-DNA tests, and they differ by the number of markers (or specific locations on the DNA) that have been iden-

tified by geneticists. Tests offered are for 12, 25, 37 or 67 markers. The price jumps for corresponding tests are significant. The 12-marker test was the least expensive at $99 (group price). I was told, however, that there could be several false positive matches with only 12 markers. False positives are exact matches at 12 markers that indicate a relationship, but further tests may show few or no additional matching markers. Starting out with a higher number of markers would provide more insight into genetic relationships and saves the wait for an updated test. In contrast, the 67-marker test is expensive, and enough information would be derived from the 37-marker test to provide me with something to work with when attempting DNA matching.

I started my FTDNA journey by filling out the online form on the Polish Project page (**http://www.ftdna.com/surname_join.aspx?code=Z27658&special=true**), selected the 37-marker Y-DNA test, and received a group discount. I chose only the Y-DNA test because I wished to find out more about the paternal side of my family. Since I did not know what the results would be, I decided to keep costs down and take the 37-marker test for now. I could always upgrade to more markers, and also have my MtDNA tested from the sample I supplied, at a later date.

Within a short time, my test kit arrived. Three swabs were provided and I took care ***not*** to use the swabs right after eating. After lightly scraping the inside of my cheek with all three swabs over a two-day period, I sent them back in the prepackaged envelope. However, instead of sending it regular mail, I decided to send it certified mail. It was not necessary, but I wanted to ensure delivery. Regardless of the certified mail, there was still some confusion because a signature was required and was not available at the time of delivery by the post office. So the sample waited one more day before delivery. FTDNA was very responsive to my e-mail inquiries and the test was finally received.

Awaiting the Results

The wait for results is approximately 6-8 weeks. The anticipation of my test results prompted some research on the Genographic Project (Shreeve 2006) and the National Geographic website (**https://www3.nationalgeographic.com/genographic/index.html**) to learn more about haplotypes and haplogroups (see insert above). The National Geographic (NG) website contains information about haplogroup origins and migration patterns. Haplogroups are essentially your ancient genetic tribe. At the time, I didn't know which group I belonged to, so read as much as I could to get familiar with the terminology. Although the NG website was a good start, it was too broad in geographic scope; so I decided to locate some specific information regarding haplogroups in Poland.

Haplotype

A haplotype is the set of values for DNA markers tested for you.

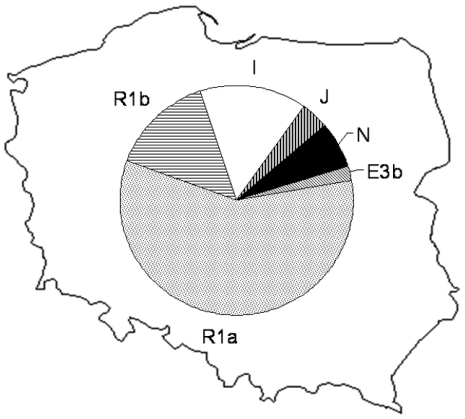
Haplogroup

Each person has a haplotype and the values of the first 12 markers provides a clue to which Haplogroup you belong. If FTDNA is less than 99.7% certain of its prediction, the company will run an additional test, at no charge, to confirm the customer's haplogroup classification.

Haplogroups are like clans or tribes. There are 21 Y-chromosome haplogroups worldwide. There are 6 common haplogroups associated with Poland.

McDonald (2005) provides a figure showing the most common haplogroups of Europe (including Poland). Figure 2 (below) is a re-creation of the haplogroups of Poland from McDonald. The most common haplogroup observed in Poland is R1a, followed by R1b, I, J, N and E3b. These haplogroups are essentially tribes that share one or more specific genetic markers. Think of haplogroups as distant relatives from thousands, even tens of thousands of

Figure 2. Common Y-DNA Haplogroups of Poland



Approximate percentages of common haplogroups found in Poland (adapted from McDonald 2005)

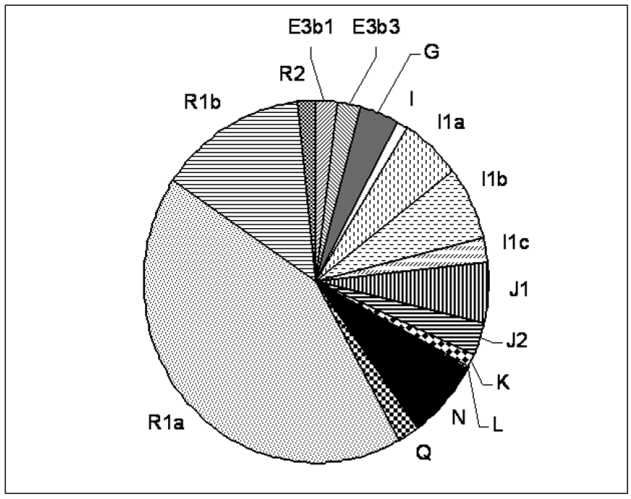
years ago. Haplogroups are considered deep ancestry.

Provided are the origins of the most common haplogroups from Poland, summarized from the National Geographic Genographic Project (2006), Wells (2006), and McDonald (2005).

The R1a haplogroup is most common in Eastern Europe, but is found in smaller percentages in Western Europe, including Norway, England, Iceland, and even in India. R1b is the most common haplogroup in Western Europe and becomes less prevalent in eastern Europe. R1a and R1b are distant cousins, genetically speaking. Haplogroup I is common in northern and southern Europe and may have originated in the Balkans. J and E3b originated from the Middle East. N may have originated in Siberia and moved westward into Europe. Finding out your haplogroup from DNA testing can provide insight into ancient migrations and may be able to expand your research.

I decided to compare the McDonald data with that of the FTDNA Polish group to see if there were any differences. The Polish group co-administrator provided me with a spreadsheet that shows participant haplogroups and their marker values but maintains their client's privacy. Figure 3 is a graph created from the spreadsheet data and shows a breakdown of participant haplogroups in the Polish group by percent of the total number of participants. Although most of the same haplogroups are present as in McDonald (2005), there is further refinement. For example, Haplogroup I, which has been determined to have originated in the Balkans, is further refined by subgroups identified as I1a, I1b and I1c. Five additional haplogroups in the Polish group appear, including R2, G, K, L, and Q. This is partially due to the scope of the Polish group, which includes participants with ancestors within the pre-World War II borders, and that would include the Jewish community and others.

Figure 3. Y-DNA Haplogroups of the FTDNA Polish Group



The Results

The results were initially e-mailed by FTDNA with a link and encoded password. The e-mail provided a link to my web page within FTDNA. On my FTDNA web page I was able to browse several DNA topics, including Set up Preferences, GedCom Uploads information, Genographic Project information, Y-DNA matches, Recent Ancestral Origins, Haplogroups, and my Y-DNA DYS values. The DNA marker value results are not very dramatic to a non-geneticist and consist of a series of values for markers that have numbers for names.

My haplogroup result confirmed Slavic origins, which was predicted by FTDNA as R1a1 and is tied to the Kurgan culture that originated in what is now Ukraine some 10,000 to 15,000 years ago (Wells 2006). This result was dramatic and opened up a view on ancestry I hadn't even thought about until now. The next step was to find potential genetic matches and interpret that data.

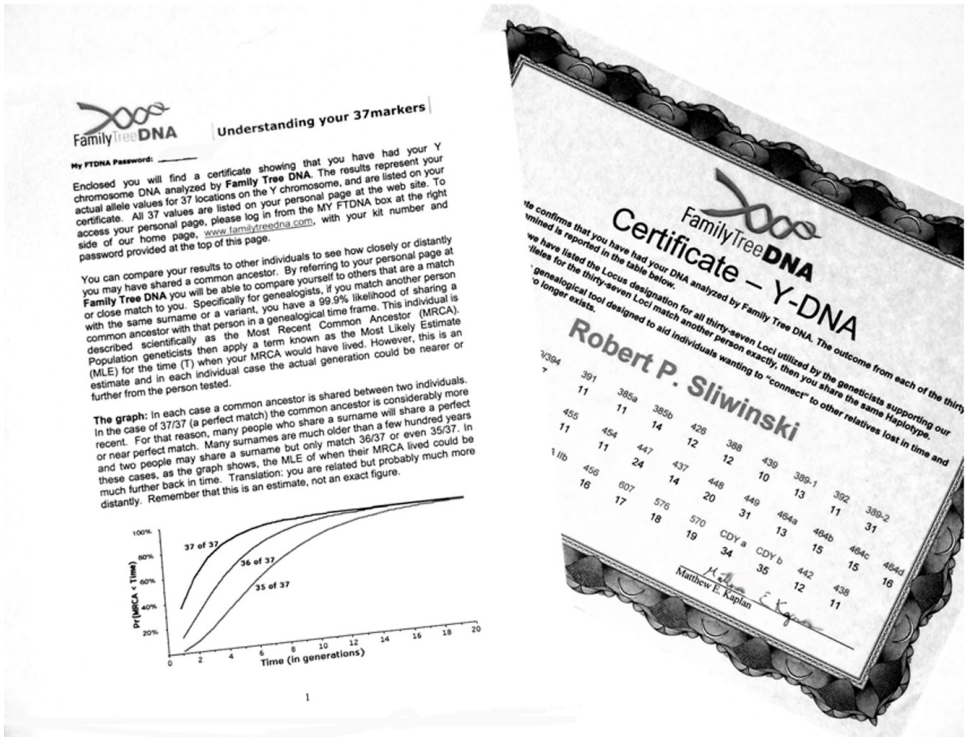
Matches on FTDNA Website

FTDNA sent an e-mail indicating that I had one match at 12 markers. I was provided the ability to contact the match, but decided to do a bit more investigation, first. On my FTDNA web page I found a few other near matches based in Germany and Poland appeared on my match spreadsheet. No exact matches were found at the 25 or 37 marker level. This is not unusual because the databases are still growing.

The DNA Paperwork

A short while later my DNA paperwork arrived in the mail. Enclosed was a certificate with my name emblazoned in large red letters, suitable for framing (Figure 4). The bottom half of the certificate contained my DYS#'s or marker values. A separate document contained the FTDNA website password and explanations of my test. The paperwork provided explanation on matches, most recent common ancestors,

Figure 4. FTDNA Certificate and Paperwork



the page, and I checked "search for only my last name" with a "genetic distance of zero" with "all haplogroups" and "all regions" to locate an exact match. The search came up with no hits (see Table 1). I did the same search except I changed "only my last name" to "do not limit to my last name," again at a genetic distance of 0. I came up with no hits. Not discouraged, I decided to adjust the choices to make sense of them.

I then changed the number of markers compared to my 37 markers to 8, and came up with 1,374 hits! The genetic distances ranged from 7-29. Genetic distance is generally the number of mismatches you have with others per marker tested. A genetic distance of 7 corresponds to a genetic match of 30 of 37 markers tested. A mismatch is one or more different values per marker. The genetic distance is the sum of all differences. The difference occur because of mutations (changes) that occur naturally over time. The fewer mismatches or the lower the genetic distance, the more likely the potential relationship may be within genealogical time.

With most of the hits the genetic distances were so great that the data has little value to a genealogist. It was, however, interesting to see the origins of the database participants of this search result, including countries such as the United States, India, Germany, England, Scotland, Ireland, Russia, and Poland. Further increasing markers for comparison to 25 reduced my hit list to 11, where genetic distances were observed to be 7-12. Finally, when I changed the markers to 30, I found out that those at the top of my previous lists were the remaining 4—none of which had Polish surnames!

the resolution of my markers, contact information and a list of useful terms to know (essentially a glossary).

Other Internet Databases – Strike Me a Match

After reviewing the FTDNA matches, I took the advice of Larry Mayka and FTDNA and searched other databases: Ysearch and Yhrd.

Ysearch (**www.ysearch.org**) is FTDNA's public database. It primarily contains FTDNA data; it does, however, contain data from other private companies, as well as the Genographic Project. From the FTDNA website I loaded my marker values into the Ysearch database. I had to include more information, such as the name and birth location of my most distant male ancestor and my e-mail contact information. I first compared my marker data to the other Sliwinski in the database. The other Sliwinski in the database was haplogroup I1A (Nordic in origin), which meant that we were not related in a historical time frame (the genetic distance was determined to be 41). Based on these test results I found that Sliwinski's could have vastly different origins, despite identical surnames.

I then searched for genetic matches and picked 37 markers from a scroll down list. At this point there are more choices on

Yhrd - Y Chromosome Haplotype Database (www.ystr.org)

This is a forensic database located in Europe that is relatively useful to search. The immediate drawback of this database

No. of Markers	*Maximum Genetic Distance*	*Last Name*	*Hits*	*Exact Matches*	*Genetic Distance*	*Origins*
37	0 or 37 markers compared	Only my last name	0	0	—	—
37	0 or 37 markers compared	Do not limit to my last name	0	0	—	—
37	> 1 or 8 markers compared	Do not limit to my last name	1,374	0	7-29	USA, India, Germany, England, Scotland, Ireland, Russia and Poland
37	>1 or 25 markers compared	Do not limit to my last name	11	0	7-12	India, USA, Germany
37	>1 or 30 markers compared	Do not limit to my last name	4	0	7	USA, India

Table 1: Searching for Matches on Y-search

is the small number of markers that you are able to search. The minimal haplotype is 9 markers, which represents 96% of their database, and now the extended haplotype is 11 markers, representing only 37% of their database. The database only has specific markers that you can compare to your own, and the number is limited. The fewer Y-DNA markers you compare in any database, the more matches you will potentially come up with, including false positive matches. When I inserted my 9 marker values into the pull-down menus, I came up with 33 matches, with individuals from Poland, Germany, Russia, France and some strange places such as Argentina; Cape Town, South Africa; and Reunion Island, off the coast of Madagascar. At the extended haplotype comparison of 11 markers, I had 4 matches – 2 in southeastern Poland, 1 in Gdańsk, Poland, and one in Lyon, France (see Table 2, below, and Figure 5, on page 10). I was relieved to see that there were matches in Poland.

Population	*# of Matches/ # Tested*	*Metapopulation*
Gdańsk, Poland	1/732	Europe
Lyon, France	1/125	Europe
Southeast Poland	2/161	Europe

Table 2: Data output from the Yhrd database for my 11 marker haplotype

Are the four matches related to me? There is a chance of deep ancestral relations; however, without comparing additional markers, the relationship cannot be solidified. This data is interesting, but there is no contact information for these individuals, unless they are also associated with a different database that allows contact.

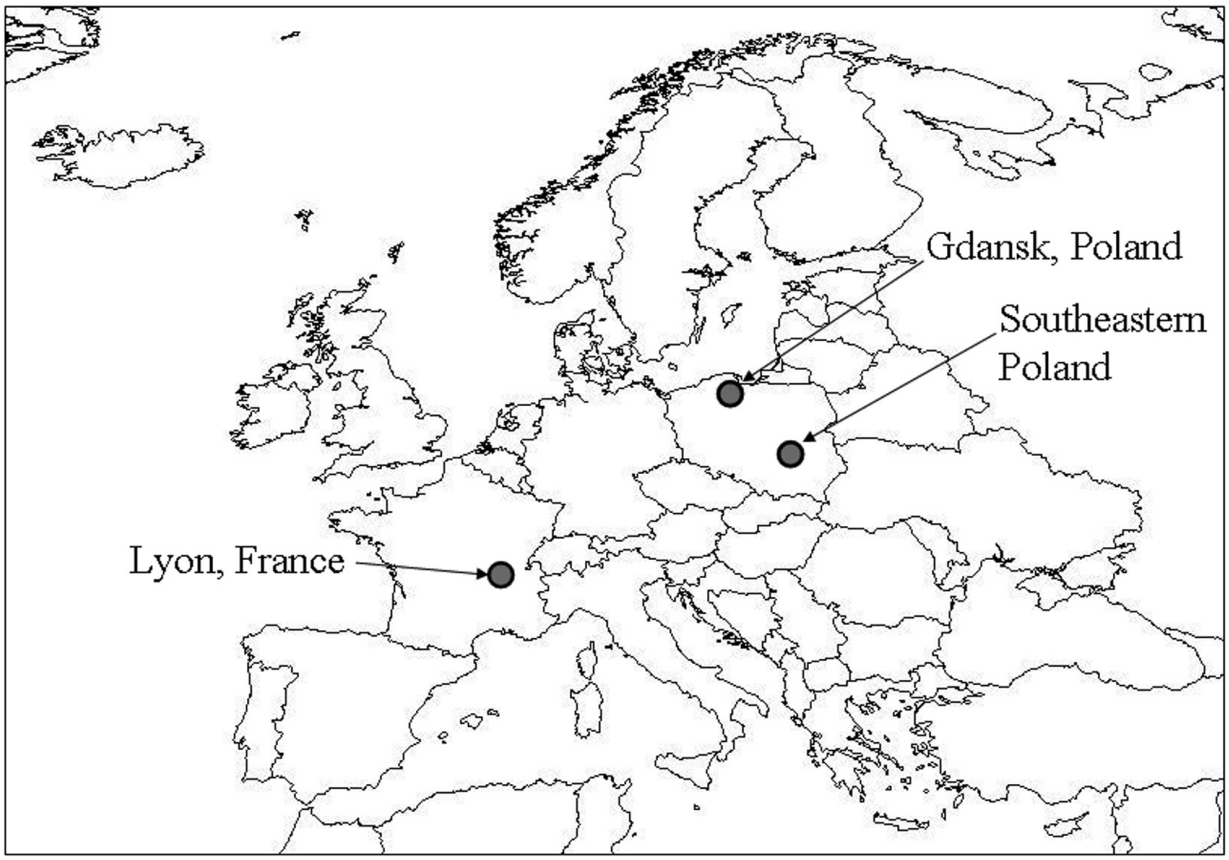
Interpretations

The Polish group co-administrator Larry Mayka provided guidance regarding the use of the FTDNA website, Ysearch database, and interpretation of my Ysearch results. He was extremely helpful and attentive to questions. No exact genetic matches were found in the Ysearch database with 29,775 unique individual haplotypes (as of March 2007). However, we live in a world population of 6 billion, and not everyone has been tested. These databases are growing daily, and checking them regularly may provide more information.

However, it was puzzling that my closest genetic near matches in Ysearch (with a genetic distance of 7) were in the U.S.A. (with English surnames) and in India. What could explain this potential distant relationship? Why were very long distant potential relatives found in England? After some research, Larry offered the following scenario as a potential connection. Our common ancestor may have been a Pomeranian Slav sent with Danish troops for the successful conquest of England approximately 1,000 years ago. I paused after I read this and read it again.

Curious about this, I checked into historical websites and books about alliances of early Poles and Danes. Around

Figure 5. Map of Europe Showing Haplotype Matches in the Yhrd Database



(Adapted from Yhrd database map)

910, prior to the establishment of the country of Poland, Slavic territory was west into Germany and close to Denmark (Santon and McKay 2005). Poles and Danes were allied through Mieszko I through the marriage of Gunhilda (Świętosława) and Svein Forkbeard (Wikipedia 2007-1). Svein Forkbeard, King of Denmark, invaded Britain, and died in 1014. The English attempted recuperation until Knut, Son of Svein and nephew of Bolesław I (Mieszko I's son), arrived off the coast of Wessex and seized both Wessex and Mercia. Once the English King died at the end of the year, Knut took control of the entire kingdom (Saul 1994). It was Bolesław I that sent troops to assist Knut on the successful conquest of England (Wikipedia 2007-2). Could my distant ancestor have been a Polish Viking? This would explain some things in the male side of my family.

There was also the distant connection to the individual in India. Several scenarios are possible: 1) Potentially any descendants from English ancestors could have been sent to India between 1600-1800 during trade times or English rule. 2) A split of the family may have occurred during migrations over a thousand years earlier, and a potential ancestor may have moved south from eastern Europe instead of north. Or there was a potential of convergence, where markers change over time and then appear to have converged to show relationships. Although rare, it is possible. Mr. Mayka added that the most extensive (and most expensive) test, Y-DNA67, which examines 67 markers, typically flushes away any "accidental convergence."

As part of my research, I contacted the English-surnamed individual project group administrator of FTDNA and posed the Polish Viking scenario to him. He replied that it was difficult to determine such a distant relationship, although the potential existed. He also suggested that a potential ancestor could have been a Slavic Roman slave brought to England some 600 years earlier.

The Time Line of Genetic Distance

Genetic distance has a calculated time line based on the number of mismatches

between compared markers and their studied genetic marker mutation rates that FTDNA and other geneticists have determined through their research. Genetic distance is more accurate when more markers are tested. Mr. Mayka explained that for 37 markers we can expect a (genetic) mutation about every 5-7 generations. A genetic distance of 7 might equal 35-49 generations, or about 875-1,225 years. The time of Bolesław I was approximately 990 years ago and the Roman rule in Britain ended in 410 A.D. So either scenario may be potentially plausible; however, the Roman slave scenario stretches the genetic data. Mr. Mayka also added that a scenario in which Vikings took Slavic slaves to England may also fit the genetic data. I now felt a connection to medieval history which I never even thought about before.

Could my ancestor have been a Polish Viking?

However, can these scenarios based on genetic distance be realistic? Mr. Mayka remarked that a genetic distance of 7 is realistic and FTDNA says so. Mr. Mayka offered a comparison between himself and another individual in the Polish project that had a genetic distance of 7. Because of this distance, the potential for being related within few generations was remote, but the chances increased dramatically over many generations, and their refinement placed a potential ancestor at 600-660 years ago.

We are all related: it's just a question of how far back you need to go to find a common ancestor.

The in-depth genetic look revealed my deep ancestry and my paternal side's potential part in medieval history. I did learn, however, that mismatches of 3 or less provide a better chance of finding related ancestors within a genealogical time-frame. A great way to find closer genetic matches is by joining or starting a surname study.

Surname Studies

Surname studies compare the Y-DNA haplotypes of those with the same or similar surnames, and may provide a connections to lost relatives. Genetic testing can also confirm biological relationships within your own family. A match made in a surname study may lead to finding common ancestors that eventually can dramatically increase a family tree. Since there was no surname study group for Sliwinski's, I plan on starting one to see how Sliwinski's all over the world are related to each other. I've already found out through this journey that not all Sliwinski's share the same haplogroup!

In order to start a surname study, Mr. Mayka recommended that a fund should be established to assist those who may not be able to pay in full for testing. Sharing some of the cost may aid in participation. Keep in mind that surname studies of very common Polish surnames may require a higher funding base to obtain larger, more meaningful participation to get matches. Costs can be reduced by having study participants take the inexpensive 12-marker test, which is suitable to confirm male relationships. At that low resolution, it may hide potential differences. If matches are confirmed, however, participants can test more markers to shed light on the timeline of the relationship.

Conclusion

The DNA testing experience has provided me an appreciation for the science and history behind genetic genealogy. The journey has inspired me to continue my genealogical investigation by starting a DNA surname study. I now feel more confident understanding my deep ancestry and my ancestors' potential role in history. The process has opened up a whole new way of looking at genealogy, and I recommend it to anyone looking for a deep ancestral connection and ways to expand their family tree through matches in genetic databases and Y-DNA surname studies. Most importantly, the more individuals participate in these types of projects, the more chances every participant will have finding a relative lost in the DNA of the human genome.

Acknowledgements:

Thanks go to Debra Hatchett, Mark Sliwinski, and especially Larry Mayka for his assistance, review and comments on this article.

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PGSA's 29TH ANNUAL FALL CONFERENCE: "BRIDGES TO THE PAST"

Linda Ulanski, Conference Chairman <lulanski@aol.com>

The planning for PGSA's 29th Annual Conference is almost complete. The title of the conference will be "Bridges to the Past," and it will be held September 28, 29 and 30, 2007 at the Schaumburg Marriott.

Our featured speaker will be **Stephen Morse**. Steve Morse is perhaps best known as the architect of the Intel 8086, predecessor of today's Pentium processor. In recent years he has focused much of his energies on genealogical endeavors. Most of the 15,000 people who visit his website every day do so for his well-known Ellis Island tools. More and more, however, are discovering his other gems, including one-step search forms for census records and the SSDI, converters for 1920/1930 enumeration districts, and tools for converting dates of the Jewish calendar.

Steve will speak on the following topics:

• One-Step Webpages: A Potpourri of Genealogical Search Tools

The One-Step website started out as an aid for finding passengers in the Ellis Island database. Shortly afterwards it was expanded to help with searching in the 1930 census. Over the years it has continued to evolve, and today includes over 100 web-based tools divided into twelve separate categories, ranging from genealogical searches to astronomical calculations to last-minute bidding on eBay. This presentation will describe the range of tools available and give the highlights of each one.

• What Color Ellis Island Search Form Should I Use?

In April 2001 the Ellis Island ship manifests and passenger records went online. A few weeks later the One-Step Ellis Island website was created to make this resource easier to use. Since that time the One-Step site has been greatly expanded to include new search capabilities and an array of color-coded search forms.

This talk will describe the evolution of the website from both a historical and a practical perspective, and provide a beacon for navigating through this color maze.

• Playing Hide and Seek in the U.S. Census

Even before the 1930 Census was unlocked on April Fool's Day 2002, researchers began wondering how they were going to locate people's records. The lack of indexes was going to present a real challenge.

Several solutions to this problem have since evolved. The One-Step Census website presents a street aid for finding records. A similar aid exists on the NARA website. And commercial websites have developed extensive indexes which are available for a fee.

The One-Step website has since been expanded to include 1910, 1920, and 1940 as well. This presentation describes and contrasts these various solutions of searching in these census years.