

# DNA and Jewish Genealogy Join Forces

by Herbert Huebscher and Elise Friedman

The application of DNA to genealogy has made great strides since its beginnings in 2000. The benefits of joining DNA and classical paper-trail methodologies are becoming evident. This article is about an advanced genealogy project currently underway that had its beginnings in a conventional Y-DNA surname project.

One of the earliest applications of DNA to genealogy has been surname projects in which DNA testing is used to determine if persons with the same or similar surnames share a recent paternal ancestor. Basic 12-marker Y-DNA tests often are sufficient to prove or disprove, with a high degree

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of certainty, the hypothesis of a common ancestor when surnames match and no documentary evidence exists to show a family relationship between similarly named individuals. The use of DNA has advanced significantly beyond that first step by delving into the possible relationships between seemingly unrelated individuals, in fact, persons with totally different surnames and disparate geographical origins.

## How the Current Project Came About

Reported in the winter 2003 issue of AVOTAYNU, the original project was the Hubscher Family DNA Project. Undertaken by the coauthor of the present article, it disproved the hypothesis that all Jewish families with the Hubscher surname (and its spelling variations)—a rare name for Jewish families—share one or two common paternal ancestors. Testing demonstrated that Herbert Huebscher’s family was not related to any of the other six Hubscher families (with Jewish paternal ancestors) he had found around the world. For example, Table 1 shows the 12-marker results for Herbert Huebscher and Reuben Hipsher showing they are not closely related because of the large number of differences in marker values. DNA testing for this project, as well as the current one, was done by Family Tree DNA (FTDNA) of Houston, Texas.

Table 1

Marker #	1	2	3	4	5	6	7	8	9	10	11	12
H. Huebscher	12	23	14	10	14	15	11	15	12	14	11	31
R. Hipsher	13	22	13	10	14	16	12	12	12	13	15	30

One interesting fact, however, did emerge from the original project. Of all the persons in the FTDNA Y-DNA

database (currently close to 100,000 individuals), Herbert Huebscher had an exact 12-marker match with only one person, a Dr. Saul Issroff in London. Huebscher and Issroff made contact and compared 25-marker results. The results showed that they still matched closely (now one point off in one marker position), and they also revealed an unusual and rare result: both exhibited the same two unusual anomalies in their 25-marker DNA results. Simply stated, one anomaly is a slight shift of value at marker 23 from 13 to 13+, denoted as 13.1. The other anomaly is the presence of an extra marker at the end of the 25-marker string, an extra copy of marker number 25. The two anomalies are independent of each other. Each has a probability on the order of 1 in 100 of random occurrence. The combined probability of random occurrence is on the order of 1 in 10,000.

Table 2 depicts the Huebscher-Issroff 12- and 25-marker Y-DNA data, as well as subsequently obtained 37-marker results. The scientific term for the string of DNA results, whether it is for 12, 25, 37 or 67 markers is “haplotype.” Table 2 presents the complete 37-marker haplotypes for Huebscher and Issroff.

Table 2 – Huebscher and Issroff DNA Results  
(Anomalies in Bold)

Marker #	1	2	3	4	5	6	7	8	9	10	11	12
H. Huebscher	12	23	14	10	14	15	11	15	12	14	11	31
S. Issroff	12	23	14	10	14	15	11	15	12	14	11	31

Marker #	13	14	15	16	17	18	19	20	21	22	<b>23</b>	24	25	<b>26</b>
Huebscher	15	9	9	11	11	25	15	20	29	13	<b>13.1</b>	15	16	<b>16</b>
Issroff	15	9	9	11	11	26	15	20	29	13	<b>13.1</b>	15	16	<b>16</b>

Marker #:	26	27	28	29	30	31	32	33	34	35	36	37
Huebscher	10	10	19	22	15	12	15	17	34	36	12	9
Issroff	10	10	19	22	15	12	15	17	34	36	12	9

## Anomalies, Matches, and the WIRTH-NiGLoSS Group

As FTDNA tested more and more individuals, additional persons and families were discovered that exhibit one or both of the anomalies and closely match Huebscher and Issroff. The men who matched adopted an acronym to stand for the first letters of the surnames of the first five such families, namely **WIRTH** (for **W**olinsky, **I**ssroff, **R**ossoff, **T**enenbaum, and **H**ubscher). As still more individuals’ results came into the database, FTDNA noted that some exhibited both anomalies (the WIRTH group), while others exhibited only the marker 23-value 13.1 anomaly. To distinguish this group from the initial WIRTH group, another acronym was adopted, namely **NiGLoSS** (for **N**itz, **G**reen-span, **L**ourie, **S**pector, and **S**pertus). Hence the name for the overall group became WIRTH-NiGLoSS. In August 2006,

the overall group included 27 families whose 37-marker results closely matched and who exhibited one or both anomalies.

### Advanced Tests

In June 2006, DNA/genealogy consultant Bonnie Schrack recommended that 11 group members take more advanced tests to validate and/or clarify the group's DNA characteristics. The object of the advanced tests was to examine in greater detail the so-called "palindromic markers," whose values are particularly difficult to determine and are prone to false readings. Of special interest were the results for DYS 464 (markers 22 through 25/26), where the group's anomalies are located.

Results clearly showed no distinction between WIRTH and NiGLoSS in those tested; in other words, it seemed that there was no separate NiGLoSS sub-group. Bennett Green-span, president and CEO of FTDNA, then suggested performing the advanced tests on all members of the group. At this writing, advanced tests on the balance of the approximately 58 persons have just been completed. Analysis of all the results is ongoing, but it is clear that there is only one group, the WIRTH group. All members of the group exhibit the shift of value at marker 23, and all (with the exception of one person) exhibit not only one extra copy of marker 25, but at least two extra copies.

The families comprising the WIRTH group all carry an unusual Y-DNA characteristic, namely a propensity for its palindromic markers to generate extra copies. This characteristic permits identification of group members with a high degree of certainty. When the matching, or closely matching, DNA characteristics are considered in combination with the two shared anomalies (that in themselves have a 1 in 100,000 chance of occurring randomly), it becomes virtually certain that group members share a relatively recent common paternal ancestor. In DNA terms, "relatively recent" means several hundred, not thousands of years ago.

### Degree of Matching within the WIRTH Group

Currently, the WIRTH group consists of 58 individuals composed of 42 families. Aside from the shared anomalies, just how closely do all the individuals and families match? The measure commonly used to gauge the degree of Y-DNA matching between two persons or families is the "Genetic Distance (GD)" between them. The GD is the number of markers at which the two persons or families differ from each other; each point of difference typically represents one mutation at one marker for either person or family. For example, the GD between Herbert Huebscher and Saul Issroff (see Table 2) is one. The two differ only at one marker, number 18. If two persons or families match exactly, the difference is zero.

Incomplete analysis of the advanced test results allows a preliminary report on the degree of matching between many of the WIRTH families as a table of GD values. The point

of reference is the so-called "modal haplotype," the Y-DNA values of the root family from which all the present families have descended. Of the 58 individuals, 37 persons representing 30 families have been tested to 67 markers. Examination of the GDs of 30 families' Genetic Distance (GD) from the WIRTH modal haplotype yields a meaningful indication of the degree of matching within the WIRTH group (see Table 3).

**Table 3. Genetic Distance of the Various Families with Respect to the WIRTH 67-Marker Norm**

Genetic Distance	Degree of Match	Number of Families
0	67/67	2
1	66/67	6
2	65/67	10
3	64/67	7
4	63/67	2
5	62/67	3
Total		30

The fact that members of the WIRTH group match closely, but to varying degrees (GD = 0 to GD = 5) helps solve two important parts of the genealogical puzzle, namely approximately when the common ancestor lived and how all the families within the group are related to each other.

### Time to Most Recent Common Ancestor (MRCA)

One important component of the genealogical puzzle presented by the WIRTH group is the question, "approximately when did the common ancestor live?" Computer models have been developed to determine the likelihood of time spans within which the MRCA lived. These models take the detailed Y-DNA data as an input and generate time intervals within which the MRCA lived—to a certain degree of likelihood. The output of such a model might be as follows: There is a 50 percent chance that the MRCA lived within an interval of 100 to 300 years ago, and a 95 percent likelihood that he lived within an interval of 100 to 450 years ago. (These numbers are just for the purpose of explanation and do not relate to any actual data or computations.)

The WIRTH group soon will be able to input all the 37- and 67-marker data from the original Y-DNA tests as well as the comprehensive data from the just-completed advanced tests into computer programs to generate MRCA time frames and their likelihoods. Lacking the results of those calculations at this time, we can provide the results of calculations that were done one year ago using the FTDNA Time Predictor (TiP) computer program on the 27 families with 37-marker data who comprised the WIRTH group. That data indicated a 95 percent probability that the MRCA lived between the years 1300 C.E. and 1700 C.E. Using considerably more and finer grain data (more families, 67-marker results and advanced test data) in conjunction with

improved computer programs should result in estimates with narrower time frames and higher degrees of confidence.

### Ashkenazic or Sephardic?

Was the MRCA an Ashkenazic or a Sephardic Jew? The first clue to the answer should be the earliest known geographical origins of the various families' paternal ancestors. Figure 1 depicts the earliest known origins of 19 of the first 21 families who had come into the WIRTH group as of March 2006. They range from Lithuania/Latvia in the north to Crimea in the south, and from Ukraine and Belarus in the east to, amazingly, Puerto Rico in the west.

Based on the fact that most known origins lie in the former Russian Pale of Settlement, one might assume that the MRCA was an Ashkenazic Jew. The hypothesis fails to account, however, for the origin of at least one family, the Rosas from Puerto Rico. Of the 42 families currently in the WIRTH group, all but seven currently are Jewish. Six of the non-Jewish families strongly suspected or knew of Jewish ancestry. Only for the Rosa family from Puerto Rico was the DNA finding of Jewish paternal ancestry a complete surprise.

The Rosa's documented genealogy goes back to 1869 in Aguada, Puerto Rico; earlier vital statistics records were destroyed in a fire. How could the descendant of a Jewish ancestor have come to live in Puerto Rico? Jews did not live openly in Puerto Rico until the end of the 19th century. The most logical explanation is that the first male Rosa to live in Puerto Rico was the descendant of a converso, a Sephardic Jew from Spain. In other words, the most reasonable and likely explanation of the Rosa family's paternal Jewish roots is that they are descendants of a Sephardic Jew. That, in turn, suggests that the MRCA of the WIRTH group may have been a Sephardic Jew.

In addition to the Rosa family's likely Sephardic roots, suggestions of Sephardic roots exist in three other WIRTH families:

1. One family's known paternal ancestral path went from France to Austro-Hungary and before that, by oral history from Spain-to-Amsterdam-to-France.
2. Another family from Lithuania has a strong oral history of its origins in Spain.
3. Still another family with earliest known origins in Lithuania has a strong oral history (with specifics) of migration to Lithuania from Salonika, Greece—where the majority of Jews were Sephardim.

At this point, we lean towards the hypothesis of Sephardic origins for the entire WIRTH group, although that still remains to be determined. One test of this hypothesis may be possible when the results of a study of DNA characteristics of Sephardic Jews by Dr. Doron Behar become available—expected to occur in late 2007. We will then be able to compare the WIRTH modal haplotype with those of Sephardic Jews.

### Are We Levites?

Some of the WIRTH families have Levite status as part

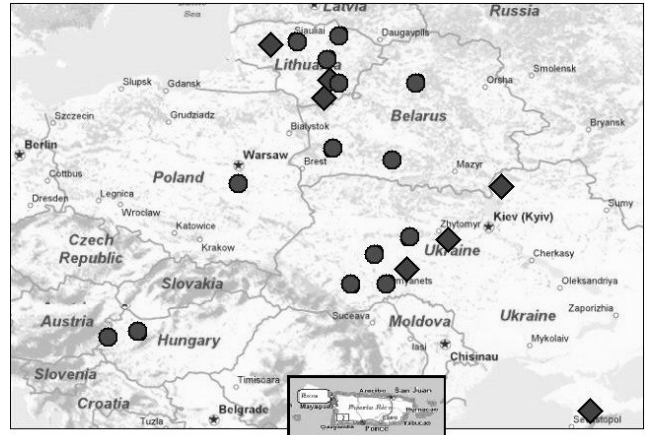


Figure 1. Geographic distribution of WIRTH group families show their origins in Belarus, Hungary, Lithuania, Poland, Ukraine and Puerto Rico.

of their family history; most do not. Tribal affiliation is another aspect of our genealogical puzzle. Levite status is handed down from father-to-son-to-son and so on, along exactly the same descendant path as Y-DNA. Therefore, if some WIRTHS are Levites, all should be—but this does not appear to be the case. The challenge is to make sense of the data. Several explanations are possible, including the illegitimate “adoption” of Levite status by the ancestors of some of our families or the artificial conferral of Levite status onto those ancestors. The most likely explanation is that we all are Levites and that, in many cases, that status was lost or forgotten through the generations.

A case in point is that of Herbert Huebescher's family. Neither Huebescher nor any of his cousins had knowledge of Levite status. One year ago, after having discovered another branch of the Hubscher family in Canada, a newly found second cousin, Sam Hebscher, remembered his father telling him that they were Levites. That seemed fairly strong evidence, but not totally convincing. More recently, Hebscher looked at his *ketubah* (marriage contract) and saw his name written in Hebrew: “Shulem Bar Mordechai Ha Levi (Shulem son of Mordechai, the Levite). We now believe that all of the currently Jewish WIRTH males are Levites.

The Levite question and the hypothesis of all being Levites also may be tested against the data expected from Behar's study mentioned above. If the WIRTHS are Levites as well as descendants of Sephardim, our Y-DNA should correlate with the Y-DNA of the Sephardic Levites in Dr. Behar's study.

### A Family Tree for the WIRTH Group: How Are We Related to Each Other?

Having established with a high degree of certainty that the WIRTH group's families share a common paternal ancestor who lived several hundred years ago, as genealogists, our thoughts turn to creating a family tree for our “very extended family.” Lacking paper trail ancestral information

or any definitive knowledge of how we all are related, however, this would seem to be an impossible task. Here DNA comes to the rescue. With all the Y-DNA information available on all of the WIRTH families, it is possible to create a genetic family tree to help visualize the relationships between the WIRTH families. The scientific term for this is “phylogenetic tree.”

Using the advanced test results data for our group, in addition to the 37- and 67-marker data we have for all our families, Elise Friedman is developing a phylogenetic tree for the group. This tree will show visually which families are closer to each other, in effect, on the same branch of the WIRTH family tree. For example, the family of Herbert Huebscher is a 67-marker match with that of Joe Farkas. This means that the Huebscher and Farkas families branch off the same “twig” of the tree; that much is evident just from looking at their 67- marker data.

Comparing the 67 markers of all members of the WIRTH project and drawing a tree by hand is a much more formidable task, so we employ the use of a special computer program to generate the phylogenetic tree. Figure 2 shows a partial phylogenetic WIRTH family tree, focusing only on the WIRTH families with 67-marker results. The center of the tree, labeled *Modal*, effectively represents the common ancestor of all WIRTH families. Two families, Berger and Tenenbaum, are an exact 67-marker match with the modal and, therefore, appear to descend directly from the common WIRTH ancestor. Several other families—Mann, Russler, Issroff, Glazer, Spertus and Caplan—are each one “step” off the modal, though on different branches of the tree, so we can say that they each descend from different descendants of the common WIRTH ancestor. Huebscher and Farkas are also one step off the modal, and now we can visually see these two families on the same branch of the WIRTH family tree. We also see that two other families, Herman and Kaplan, each descend and split from the Huebscher/Farkas branch of the WIRTH family tree.

We have also begun to correlate genetic proximity with geographic proximity for some of the WIRTH families. For example, another perfect 67-marker match between the Perlen and Tuerk families shows that these families are very closely related. The phylogenetic tree illustrates this by showing them on the same branch. We also know that the Perlen and Tuerk families both lived in the Pinsk area of Belarus. Thus, even lacking a paper trail that connects these two families, the 67-marker match and their geographic proximity lead us to conclude that they share a relatively recent common ancestor, possibly within the past 200-300 years, shortly before Jewish families in this area were required to adopt surnames.

We are in the process of developing a more extensive WIRTH phylogenetic tree that includes both the 67-marker

and advanced testing data. More branches or twigs will be added to the tree as more of the existing WIRTH project members upgrade to the full 67 markers and advanced testing. Just as new branches are continually added to a traditional family tree when new documentation is found, so also we can continually add branches to the WIRTH phylogenetic tree as we identify new WIRTH families through Family Tree DNA.

### Conclusions—DNA and Jewish Genealogy.

The foregoing example of using DNA to create a family tree for part of the WIRTH group, and subsequently for the entire group, illustrates important points about DNA and Jewish genealogy. Where we, as Jewish genealogists previously have been inclined to “give up” because we hit a

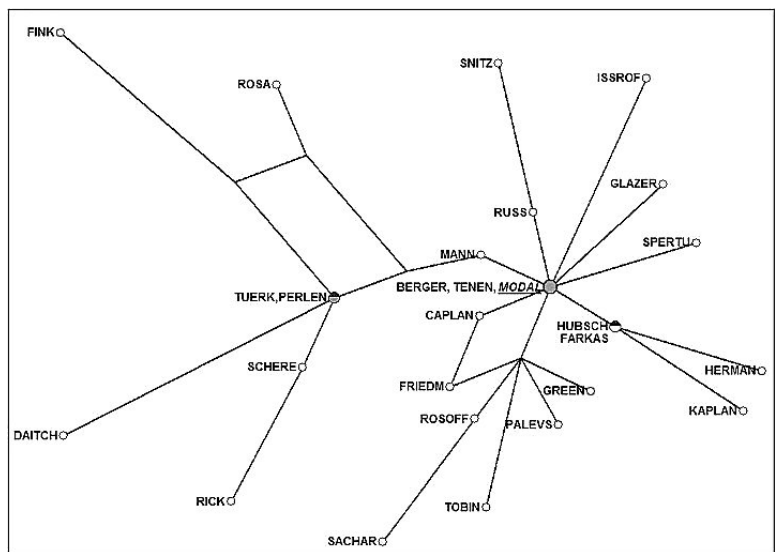


Figure 2: Partial Phylogenetic Tree of WIRTH Group Families with 67 Markers

brick wall with paper trail genealogy, we now have an important tool that may help us surmount some of the brick walls. The Huebscher/Farkas and Perlen/Tuerk DNA matches and locations on the same twigs of the WIRTH family tree offer clues that can be explored in the future through conventional genealogical methods. We know that a connection exists; we need only find the documentary evidence.

Still another example might lie in future research into the Rosa family’s ancestry. Archives in Spain that hold duplicates of Puerto Rican records may reveal an ancestral chain going back to the time of the Inquisition. The Rosa family’s Jewish ancestor may be identified and the MRCA of the WIRTH group become known.

The WIRTH Project demonstrates on a broader scale that Y-DNA can literally find a large group of families who previously had no knowledge of having any connection with each other, much less a blood relationship. This is

made possible by the build-up of a large DNA database of Jewish men and by the accessibility of that database for searches and identification of matches. When a new person has his DNA tested, his results are added to the database and compared to all previously tested persons' results. If a match is found, each individual involved in the match is notified. One can project into the future and visualize a database of Jewish men large enough (having passed "critical mass" size) from which a family tree of paternal ancestral connections can be constructed for a major portion of the Jewish people. In that sense, a Jewish man does a *mitzvah* (good deed) when he contributes his DNA to the growing database of Jewish male DNA.

Family Tree DNA of Houston, Texas, now has a database of approximately 4,000 Jewish persons (out of a total of close to 100,000 individuals). As this database grows, the probability of finding a match increases. The moral of the story here is twofold:

- If a Jewish genealogist is considering a DNA test of himself or a family member, he/she should have the testing done by a company with a large and growing database of Jewish persons.

- It is important to choose a company that provides full access to one's own results as well as notification of matches with other persons. Family Tree DNA is the organization that meets those criteria. One should be particularly wary of offers by some organizations of free DNA

tests for genealogical purposes. To the best of our knowledge, organizations making such offers do not make the results available to tested individuals and do not advise persons of possible matches. Instead, those organizations are able to use the DNA results for their own genealogical and religious purposes.

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*Herbert Huebscher, born in Vienna, Austria, holds BEE, MS and MBA degrees. Long involved in his family's genealogy, he ventured into DNA-based genealogy in 2002 with the Huebscher Family DNA Project, described in AVOTAYNU (Winter 2003). Since 2004, he has led the WIRTH group DNA-based genealogy research project. Huebscher lives in New Hyde Park, New York.*

*Elise Friedman has been researching her roots in Belarus, Galicia, Poland, Russia and Ukraine since 1999 and has been active in genetic genealogy since 2005. She is the administrator of the Palevsky, Lifshitz and Belarusian Jewish Polesie DNA projects and co-administrator of the WIRTH DNA project at Family Tree DNA. Ms. Friedman is a member of the International Society of Genetic Genealogists (ISOGG) and is the immediate past president of the Jewish Genealogy Society of Maryland. She has given presentations and hands-on workshops on a variety of genealogy topics at IAJGS conferences, JGS meetings, synagogues and community libraries.*

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