REVIEW OF DUNHAM DNA PROJECT RESULTS[i]

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Our DNA testing project commenced in January 2002. Thirty-eight (38) males have been tested. Others are considering it.

The test analyzes values (number of repeats of the DNA sequence) in specific locations (markers) of the DNA gene string of males. The Y chromosome is passed from father to son. This allows comparisons to be made among the results for individuals who are believed to be related. Normally, these values will be the same although over a long period of time there may be some subtle changes (called mutations).

There are several reasons for testing: (1) to determine that a relationship exists, (2) to confirm there is no relationship or the relationship is the result of a non-paternity event, and (3) to analyze mutations that have appeared.

Three levels of testing are now possible with our testing organization – 12, 25 or 37 markers or locations on the gene string. The 12-marker test in essence determines that a relationship exists or does not while the 25 and 37 marker tests refine the results.

We began with 2 participants as controls – individuals whose ancestry had been proved through regular genealogical research. Gratia Dunham Mahony, a professional genealogist, was instrumental in determining the controls and suggesting individuals for testing. One control emanated from the Deacon John Dunham line while the other was from Richard Singletary (Jonathan Dunham alias Singletary) line.

In a memo September 28, 2003 Gratia D. Mahony observed:

> … it should be noted that DNA samples have been provided by descendants of ALL OF THE SONS of Deacon John [1] Dunham who had sons. These sons were: John[2] Dunham (b. 1615); Samuel[2] Dunham (b. 1623); Jonathan[2] Dunham (b. abt. 1625); Joseph[2] Dunham (b. abt. 1631); and Benajah[2] Dunham (b. abt. 1637).[ii]

In a memo October 20, 2003 Gratia D. Mahony observed when advancing information for Jonathan Dunham alias Singletary participants:

> The attached documentation file for the descendants of a line currently called the "Singletary/alias Dunham line" may help to allow descendants to determine their connection to the immigrant ancestor. It is believed that all of these lines originate from a man whose name was Richard Singletary. His first son, Jonathan, assumed the surname of DUNHAM at the time he moved to Woodbridge New Jersey. All of his descendants used the surname Dunham, or various spellings of that surname. The descendants of Richard Singletary's other sons used the surname SINGLETARY. It is not known why Jonathan Singletary/alias Dunham chose to use the Dunham name.

Four of the lines in this file show descent from a John Dunham/Dunnam first found in South Carolina. Because of the marriage of this John Dunnam to Hannah Singletary (a granddaughter of Richard Singletary) it is believed that he is connected to the Massachusetts Singletary family who migrated to South Carolina in 1696-7. DNA analysis shows a match to the descendants of Jonathan Singletary/alias Dunham of Woodbridge New Jersey. There is a one step mutation in one of these lines.[iii]

The remainder of this discussion portrays the results[iv] of the testing. Since testing began results have been posted to a web site utilizing both names and test kit numbers. In this presentation both will also be utilized in the interests of enhancing our understanding of the testing.

All participants (38) received results for the Y-DNA 12-marker test, while 25 persons had their analysis extended to 25 markers and 2 individuals were extended to 37 markers. The number of separate 12-marker strings and number of individuals involved in each is shown in Table 1.

Table 1.
Y-DNA Results (12 Markers)

	Separate strings	Number of Results	Percent of Total
	1	11	28.9
	1	11	28.9
	1	2	5.3
	1	2	5.3
	12	12	31.6
Total	16	38	100.0

Twelve participants in the Y-DNA 12-marker test produced 12 different result strings indicating that 31.6% of the participants did not exactly match any other participant.

Table 2 portrays the values[v] of the 12-marker test for the 38 participants. The values are separated into four groups in which the values are exactly equal or quite similar and one group in which there are no exact matches.

Table 2. DNA 12-Marker Test Results

Name	* Haplo	DYS# 393	390	19	391	385a	385b	426	388	439	389I1	392	389I2	GD
Donald C Dunham	R1a	12	25	15	11	11	14	12	12	10	13	11	30	
James Leroy Dunham	R1a	12	25	15	11	11	14	12	12	10	13	11	30	
George Dunham **	-[vi]	13	22	15	10	13	14	11	14	11	12	11	28	0
Richard E Dunham	-	13	22	15	10	13	14	11	14	11	12	11	28	0
Jason K Dunham	-	13	22	15	10	13	14	11	14	11	12	11	28	0
Robert W Dunham	-	13	22	15	10	13	14	11	14	11	12	11	28	0
Gary Roger Dunham	-	13	22	15	10	13	14	11	14	11	12	11	28	0
John L Dunham	-	13	22	15	10	13	14	11	14	11	12	11	28	0
Russell Henry Dunham III	-	13	22	15	10	13	14	11	14	11	12	11	28	0
William Clarence Dunham	-	13	22	15	10	13	14	11	14	11	12	11	28	0
A. Neil Dunham	-	13	22	15	10	13	14	11	14	11	12	11	28	0
Carl A Dunham	-	13	22	15	10	13	14	11	14	11	12	11	28	0
Paul C Dunham	-	13	22	15	10	13	14	11	14	11	12	11	28	0
R. Howard Dunham	I	13	22	15	10	13	14	11	14	11	12	11	29	1
Edward Lee Dunham	-	13	22	15	11	13	14	11	14	11	12	11	28	1
Durwood Robinson Dunham	-	13	22	15 + 16	10	13	14	11	12	11	13	11	31	
John William Dunham	-	13	22	15 + 16	10	13	14	11	12	11	13	11	31	
John Stewart Dunham	R1b	13	23	14	10	11	14	12	12	13	13	13	29	
Thomas William Dunham	R1b	13	23	14	11	11	15	12	12	12	13	13	30	
Mark I Dunham	R1b	13	23	14	11	11	15	12	12	13	14	13	30	
Archie W. Dunham	R1b	13	24	14	11	12	14	12	12	12	13	13	29	
Lindsay Dunham	I	14	23	15	10	15	15	11	13	12	13	12	31	1
Lloyd Eugene Dunham	I	15	23	15	10	14	15	11	13	12	13	12	30	2
James T Dunnam	I	15	23	15	10	15	15	11	13	12	13	12	30	1
J Salway	I	15	23	15	10	15	15	11	13	12	13	12	31	0
David B Dunham	I	15	23	15	10	15	15	11	13	12	13	12	31	0
Kirk Louis Dunham	I	15	23	15	10	15	15	11	13	12	13	12	31	0
Franklin Carl Dunnam	I	15	23	15	10	15	15	11	13	12	13	12	31	0
Francis E. Dunnam	I	15	23	15	10	15	15	11	13	12	13	12	31	0
Larry Gene Dunham	I	15	23	15	10	15	15	11	13	12	13	12	31	0
David Lee Dunham	I	15	23	15	10	15	15	11	13	12	13	12	31	0
Victor Reid Donham	I	15	23	15	10	15	15	11	13	12	13	12	31	0

Table 2. DNA 12-Marker Test Results (Continued)
DYS#

Norman (Jerry) J. Singletary **	I	15	23	15	10	15	15	11	13	12	13	12	31	
Andrew E. Dunham	I	15	23	15	10	15	15	11	13	12	13	12	31	0
Sam E. Dunnam	I	15	23	15	10	15	15	11	13	12	13	12	31	0
James D. Donham	I	15	23	15	10	15	16	11	13	12	13	12	31	1
Carl E Dunham	I	15	23	15	11	15	15	11	13	12	13	12	30	2
Robert Bruce Dunham	I	15	24	15	10	15	15	11	13	12	13	12	31	1

** Control – Individual whose ancestry was validated.

Within the groups in Table 2 some markers have different colors from the most prevalent color. The red entries portray markers with a value higher by one [a single-step mutation] than the control while green entries demonstrate a value lower by one.

The results of the tests for the top group in yellow and the group in coral in the middle are exactly the same – no mutations.

The group in light green shows several mutations; however, no conclusions can be drawn since there is no control. It is a group for which more testing would be useful if potential test participants could be obtained.

The group in blue is the Deacon John Dunham descendants. For this group I have shown the genetic distance calculations[vii] performed by FTDNA. It will be noted there are only two individuals with a genetic distance of 1. These two (R. Howard Dunham and Edward Lee Dunham) are assumed to be related to Deacon John Dunham.

Gratia Dunham Mahony has noted that the line of R. Howard Dunham is a probable line based upon circumstantial evidence. Since the DNA testing she noted the search for ancestors for Matthew Dunham has been re-kindled.[viii]

Gratia also noted in this same context that while the 25-marker test for Edward Lee Dunham showed an additional single-step mutation, it was felt he was still related to Deacon John Dunham.[ix] This will be reviewed further in the next table.

The group in lavender relates to the descendants of Richard Singletary (Jonathan Dunham alias Singletary).

This group has four individuals with calculated genetic distances of 1 and two with a genetic distance of 2. Research indicates these individuals are all related; however, the individuals with genetic distances of 2 might require more research and testing. This issue will be addressed further with a review of the 25-marker testing results.

FTDNA interpretation of genetic distance in the 12-marker test indicates a distance of 0 is related, 1 is possibly related, 2 is probably not related and 3 or greater is not related.[x]

The interpretation in the 25-marker test shows a distance of 0 or 1 is related, 2 is probably related, a distance of 3 is probably not related and 4 or more is not related.[xi]

25- and 37-Marker Test Results

Test participants who have had the 12-marker test may have their tests extended either to 25 or 37 markers. This extension provides refinement of the 12-marker test results. Table 3 portrays results of the 25-marker test results.

Table 3. DNA 25-Marker Test Results

			DYS#																										
Kit	Name	Haplo	393	390	19	391	385a	385b	426	388	439	389-1	392	389-2	458	459a	459b	455	454	447	437	448	449	464a	464b	464c	464d	GD
7774	Carl A Dunham	-	13	22	15	10	13	14	11	14	11	12	11	28	14	8	9	8	11	23	16	20	28	12	14	15	17	0
2135	Paul C Dunham **	-	13	22	15	10	13	14	11	14	11	12	11	28	14	8	9	8	11	23	16	20	28	12	14	15	17	
2967	R. Howard Dunham	I	13	22	15	10	13	14	11	14	11	12	11	29	14	8	9	8	11	23	16	20	28	12	14	15	17	1
10458	Edward Lee Dunham	-	13	22	15	11	13	14	11	14	11	12	11	28	15	8	9	8	11	23	16	20	28	12	14	15	17	2
2138	Lloyd Eugene Dunham	I	15	23	15	10	14	15	11	13	12	13	12	30	15	7	10	11	11	24	14	20	27	11	12	14	15	3
3013	James T Dunnam	I	15	23	15	10	15	15	11	13	12	13	12	30	15	10	10	11	11	24	14	20	28	11	11	15	15	6
1786	David Lee Dunham	I	15	23	15	10	15	15	11	13	12	13	12	31	15	7	10	11	11	24	14	20	27	11	12	14	15	1
2928	Victor Reid Donham	I	15	23	15	10	15	15	11	13	12	13	12	31	15	7	10	11	11	24	14	20	27	11	12	14	15	1
4961	Norman (jerry) J. Singletary *	I	15	23	15	10	15	15	11	13	12	13	12	31	15	7	10	11	11	24	14	20	28	11	12	14	15	
6553	Andrew E. Dunham	I	15	23	15	10	15	15	11	13	12	13	12	31	15	7	10	11	11	24	14	20	28	11	12	14	16	1
2303	Sam E. Dunnam	I	15	23	15	10	15	15	11	13	12	13	12	31	15	10	10	11	11	24	14	20	28	11	11	15	15	5
12738	James D. Donham	I	15	23	15	10	15	16	11	13	12	13	12	31	15	7	10	11	11	24	14	20	27	11	12	14	15	2

* Control ** Proxy control G D = Genetic Distance

Again, cells in red indicate a value higher by one than the control, dark green indicate a value lower by 1 while a light green indicates a value greater by 3.

The control used in the 12-marker group for the blue group has not had the extended 25-marker test, thus, creating an analysis problem. An individual, who participated in both tests, having exactly the same values as the control in the 12-marker group, was substituted as a proxy control. [See discussion for follow-up activities below.]

In Tables 2 and 3 above the genetic distance values calculated by the technique proffered by FTDNA are shown. Table 4 compares these values for individuals participating in both 12-marker and 25-marker testing.

Table 4. Comparison of Genetic Distances

Individual	12-Marker	25-Marker	Change
Carl A. Dunham	0	0	0
R Howard Dunham	1	1	0
Edward L Dunham	1	2	+1
Lloyd E Dunham	2	3	+1
James T Dunnam	1	6	+5
David L Dunham	0	1	+1
Victor R Donham	0	1	+1
Andrew E Dunham	0	1	+1
Sam E Dunnam	0	5	+5
James D Donham	1	2	+1

Table 4 demonstrates that some substantial changes are possible in genetic distance information when the number of markers is increased from 12 to 25.

The following items review the changes in probability of sharing a common ancestor when using the 12-marker test and the 25-marker test.[xii]

If I compare the probability of my sharing a common ancestor with Carl A. Dunham (Genetic Distance = 0) at 100-year intervals, I obtain these results from the 12-marker and 25-marker tests:

Table 5-a. Probability of a Common Ancestor

# Markers	100 years	200 years	300 years	400 years	500 years	600 years
12						
	33.57%	55.88%	70.69%	80.53%	87.07%	91.41%
25						
	61.7%	84.92%	94.15%	97.73%	99.12%	99.66%

The 25-marker test improves the probabilities substantially.

If I compare the probability of a common ancestor between Lloyd E. Dunham and Jerry Singletary (Genetic Distance = 2 in 12-marker test and 3 in 25-marker test) at 100-year intervals, I obtain these results from the 12-marker and 25-marker tests:

Table 5-b. Probability of a Common Ancestor

# Markers	100 years	200 years	300 years	400 years	500 years	600 years
12						
	0.82%	4.27%	10.51%	18.80%	28.21%	37.91%
25						
	1.48%	10.15%	25.93%	44.17%	60.84%	74.03%

In this instance the 25-marker results also provide some improvement in the probabilities; however, a major problem is present. Both tests indicate there is no relationship.

The final example looks at the probability that Sam E. Dunnam and Jerry Singletary have a relationship.

Table 5-c. Probability of a Common Ancestor

# Markers	100 years	200 years	300 years	400 years	500 years	600 years
12						
	33.57%	55.88%	70.69%	80.53%	87.07%	91.41%
25						
	1.81%	11.95%	29.58%	48.95%	65.76%	78.38%

This case shows that the refinement of the 12-marker test with the 25-marker test can suggest that there probably is no relationship. Since the genealogical research has documented a relationship, one would conclude additional testing needs to be undertaken, if possible.

37-Marker Testing

Extending the testing of the participants to 37 markers has occurred for only two persons – one in each of the two major groupings reviewed. In both cases the 37-marker tests were not undertaken for the controls. Thus, the 37-marker tests have had no notable effect upon the refinement process.

Summary

This review suggests the following:

1. Utilization of the 25-marker test has been very valuable.
2. The five groupings used in this review probably are not sufficient.
3. Additional testing ought to be undertaken.
4. Further effort at traditional genealogical research may be needed in some instances.

Testing level

The 12-marker test seems reasonable initially to determine that a relationship exists. Wherever possible when a relationship is found, individuals who have used the 12-marker test should upgrade at least to the 25-marker test.

Individuals being used as controls should be upgraded to the 37-marker test. It is imperative that George Dunham be upgraded from the 12-marker test so his control status can be utilized throughout the testing levels. Jerry Singletary should be upgraded from the 25-marker test to 37-marker test since he is a control.

Groupings for reporting purposes

While the 5 groupings utilized for reporting in the 12-marker tests appear initially reasonable, they appear deficient when results from the 25-marker testing are reviewed. Where there is a genetic distance greater than 2 measured, new groupings should be created. When the genetic distance under the 25-marker test is measured at 2 or 3, caution should be maintained in concluding relationships with others in the group.

An additional report showing the genetic distance between the control and others in the same group should be prepared and made available on the web site. Where there is no control in some of the groupings, an effort to obtain a control would be valuable.

Sam E. Dunnam and James T. Dunnam should be removed from the group in which Jerry Singletary is the control (lavender colored group) and established as a separate grouping. Lloyd E. Dunham probably should also be removed and a separate group created including Andrew E. Dunham

James D. Donham, David Lee Dunham and Victor R. Donham might be placed in a separate group.

At this point these persons might be placed in separate categories: [John S. Dunham], [Mark I. Dunham] and [Archie W. Dunham and Thomas William Dunham].

If these additional groupings are valid, some new research directions may be required.

Additional testing

An effort needs to be made to extend the testing for persons who have only utilized the 12-marker test. Additional participants in the testing program would provide more information and probably refine conclusions being drawn from the existing tests. When the Dunham/Singletary Family Connections achieves exempt non-profit status, external funding to support more extensive testing might be sought. In the meantime persons who can do so might consider upgrading their tests.

Reorganization of Results Pages

The following pages depict the reorganization of our results pages along the lines suggested above.

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[i] Prepared March 2005.
[ii] Memo to Jennifer Spangle, Genomic Analysis Technology Core from Gratia Dunham Mahony and Paul Clinton Dunham, 28 September 2003.
[iii] *Ibid*. 20 October 2003.
[iv] Raw data for the tests may be found beginning at http://www.pcdunham.ws/TestResults-p1-A.htm.
[v] The values are simply the count of repeated patterns or sequences of DNA at a chromosome location.
[vi] While FTDNA reports only one individual in Haplogroup I, it is believed all should be. Additional testing could be undertaken to problem this inclusion.

[vii] The genetic distance values are calculated by FTDNA and available to the project coordinator. Participants are able to obtain these reports by logging onto their personal page at FTDNA.
[viii] Gratia D. Mahony, "Genealogical References for Members of the Dunham Family", prepared for the FTDNA Mutation Study, September, 2003, pp.9-10
[ix] *Ibid*. p 25.
[x] "Interpreting Genetic Distance, 12 Markers", http://www.ftdna.com/gdrules_12.html, 3/16/2005
[xi] "Interpreting Genetic Distance – 25 Markers", http://www.ftdna.com/gdrules_25.html
[xii] These results were calculated by FTDNA and presented in individual FTDNATiP Reports available to the project coordinator.

		DYS#																																					
Kit	Name	*Haplo	393	390	19	391	385a	385b	426	388	439	389|1	392	389|2	458	459a	459b	455	454	447	437	448	449	464a	464b	464c	464d	460	GATAH4	YCAIIa	YCAIIb	456	607	576	570	CDYa	CDYb	442	438
1785	George Dunham	-	13	22	15	10	13	14	11	14	11	12	11	28																										
2137	Richard E Dunham	-	13	22	15	10	13	14	11	14	11	12	11	28																										
2139	Jason K Dunham	-	13	22	15	10	13	14	11	14	11	12	11	28																										
2140	Robert W Dunham	-	13	22	15	10	13	14	11	14	11	12	11	28																										
2330	Gary Roger Dunham	-	13	22	15	10	13	14	11	14	11	12	11	28																										
3012	John L Dunham	-	13	22	15	10	13	14	11	14	11	12	11	28																										
5791	Russell Henry Dunham III	-	13	22	15	10	13	14	11	14	11	12	11	28																										
6101	William Clarence Dunham	-	13	22	15	10	13	14	11	14	11	12	11	28																										
6219	A. Neil Dunham	-	13	22	15	10	13	14	11	14	11	12	11	28																										
7774	Carl A Dunham	-	13	22	15	10	13	14	11	14	11	12	11	28	14	8	9	8	11	23	16	20	28	12	14	15	17												
2135	Paul C Dunham	-	13	22	15	10	13	14	11	14	11	12	11	28	14	8	9	8	11	23	16	20	28	12	14	15	17	11	10	19	21	14	14	16	18	34	37	13	10

2967	R. Howard Dunham	I	13	22	15	10	13	14	11	14	11	12	11	29	14	8	9	8	11	23	16	20	28	12	14	15	17												
10458	Edward Lee Dunham	-	13	22	15	11	13	14	11	14	11	12	11	28	15	8	9	8	11	23	16	20	28	12	14	15	17												

			DYS#																																					
Kit	Name	*Haplo	393	390	19	391	385a	385b	426	388	439	389-1	392	389-2	458	459a	459b	455	454	447	437	448	449	464a	464b	464c	464d	460	GATAH4	YCAIIa	YCAIIb	456	607	576	570	CDYa	CDYb	442	438
23205	Lindsay Dunham	I	14	23	15	10	15	15	11	13	12	13	12	31																										
15892	J Salway	I	15	23	15	10	15	15	11	13	12	13	12	31																										
19892	David B Dunham	I	15	23	15	10	15	15	11	13	12	13	12	31																										
24925	Kirk Louis Dunham	I	15	23	15	10	15	15	11	13	12	13	12	31																										
3712	Franklin Carl Dunnam	I	15	23	15	10	15	15	11	13	12	13	12	31																										
4307	Francis E. Dunnam	I	15	23	15	10	15	15	11	13	12	13	12	31																										
7936	Larry Gene Dunham	I	15	23	15	10	15	15	11	13	12	13	12	31																										
4961	Norman (jerry) J. Singletary	I	15	23	15	10	15	15	11	13	12	13	12	31	15	7	10	11	11	24	14	20	28	11	12	14	15												
2136	Carl E Dunham	I	15	23	15	11	15	15	11	13	12	13	12	30																										
13422	Robert Bruce Dunham	I	15	24	15	10	15	15	11	13	12	13	12	31																										

		DYS#																																						
Kit	Name	*Haplo	393	390	19	391	385a	385b	426	388	439	389-1	392	389-2	458	459a	459b	455	454	447	437	448	449	464a	464b	464c	464d	460	GATAH4	YCAIIa	YCAIIb	456	607	576	570	CDYa	CDYb	442	438
10392	Donald C Dunham	R1a	12	25	15	11	11	14	12	12	10	13	11	30																										
15473	James Leroy Dunham	R1a	12	25	15	11	11	14	12	12	10	13	11	30																										
6097	Durwood Robinson Dunham	-	13	22	15+16	10	13	14	11	12	11	13	11	31																										
6098	John William Dunham	-	13	22	15+16	10	13	14	11	12	11	13	11	31																										
1786	David Lee Dunham	I	15	23	15	10	15	15	11	13	12	13	12	31	15	7	10	11	11	24	14	20	27	11	12	14	15												
12738	James D. Donham	I	15	23	15	10	15	16	11	13	12	13	12	31	15	7	10	11	11	24	14	20	27	11	12	14	15	11	9	18	21	15	15	17	18	33	39	12	10
2928	Victor Reid Donham	I	15	23	15	10	15	15	11	13	12	13	12	31	15	7	10	11	11	24	14	20	27	11	12	14	15												

2303	Sam E. Dunnam	I	15	23	15	10	15	15	11	13	12	13	12	31	15	10	10	11	11	24	14	20	28	11	11	15	15
3013	James T Dunnam	I	15	23	15	10	15	15	11	13	12	13	12	30	15	10	10	11	11	24	14	20	28	11	11	15	15
2138	Lloyd Eugene Dunham	I	15	23	15	10	14	15	11	13	12	13	12	30	15	7	10	11	11	24	14	20	27	11	12	14	15
6553	Andrew E. Dunham	I	15	23	15	10	15	15	11	13	12	13	12	31	15	7	10	11	11	24	14	20	28	11	12	14	16
8360	John Stewart Dunham	R1b	13	23	14	10	11	14	12	12	13	13	13	29													
5017	Mark I Dunham	R1b	13	23	14	11	11	15	12	12	13	14	13	30													
2329	Archie W. Dunham	R1b	13	24	14	11	12	14	12	12	12	13	13	29													
26688	Thomas William Dunham	R1b	13	23	14	11	11	15	12	12	12	13	13	30													

34955 Scot Singletary