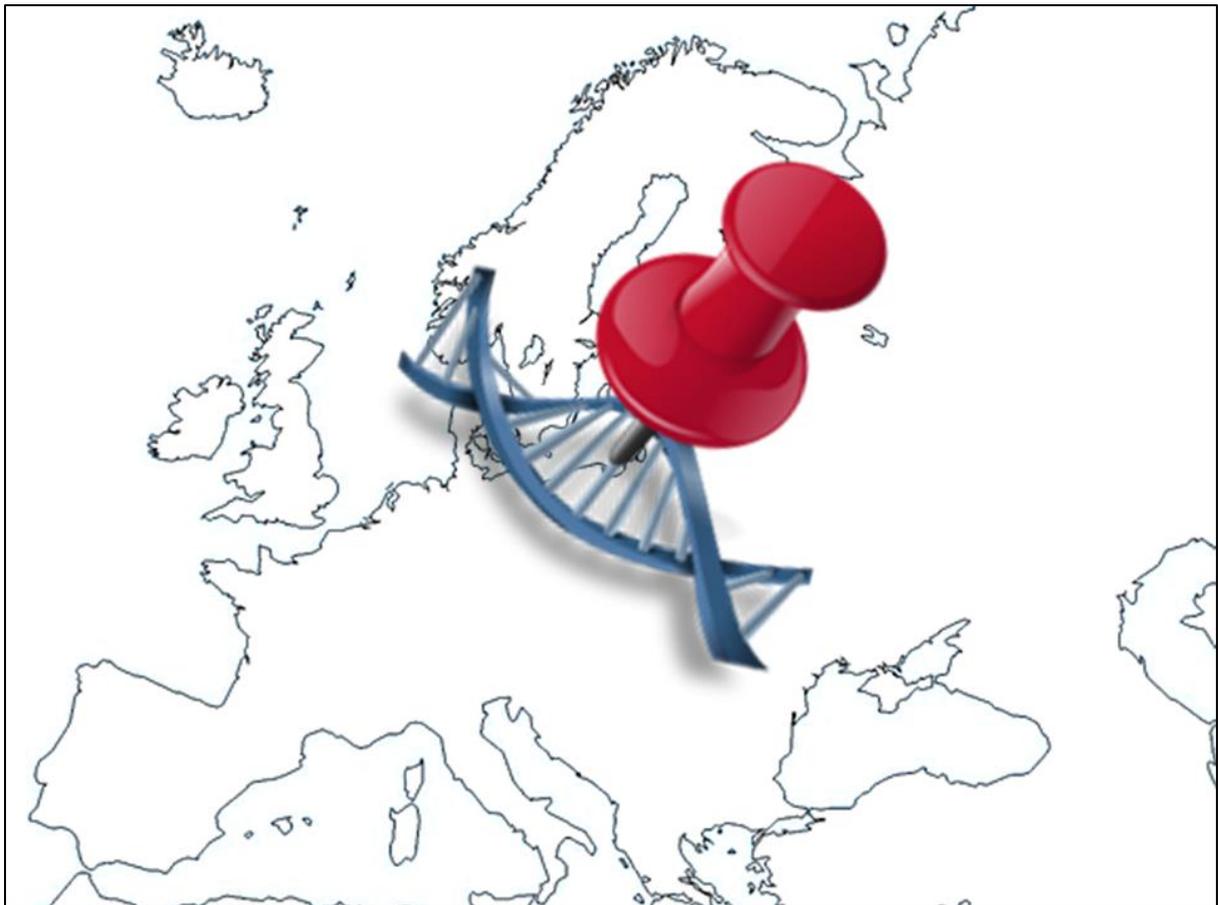


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Pinpointing the Anthony Mitochondrial Eve



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Dr Tyrone Bowes
31st December 2019

Anthony mtDNA Report

INTRODUCTION

Mitochondrial DNA (mtDNA) is located in the mitochondrial organelles found within eukaryotic cells. Human mtDNA consists of 16,569 DNA base pairs that encode 37 genes that produce proteins essential in converting the chemical energy stored in food into a form that our cells can use. Remarkably millions of years ago the mitochondria were prokaryotic cells (bacteria), capable of implementing oxidative mechanisms (that were not possible for eukaryotic cells) which became endosymbionts; literally living within the eukaryote cell. As extrachromosomal DNA, the mtDNA is only passed from a mother to her offspring and hence it can be used to explore one's maternal ancestral journey.

INTERPRETING MR ANTHONY'S' MITOCHONDRIAL DNA RESULTS

In commercial ancestral DNA testing the same golden rule applies; the more genetic markers or mutations that 2 people share the more recent their shared ancestor once lived. Hence the people that one matches upon commercial ancestral mtDNA testing will share a common female ancestor from different locations and time points over potentially many tens of thousands of years. In addition, many of these mtDNA genetic relatives reveal details of earliest known maternal ancestors (names and locations). By examining the ancestral detail revealed among one's mtDNA matches, graded according to genetic distance, one can potentially identify an origin for Mr Anthony's maternal Eve.

The test subject's mtDNA matches are not random; all share his U5a1b1a Haplogroup which science has revealed is associated with a single female who lived somewhere within Western Europe approximately 4,000 years ago, see **Figures 1** and **2**. In addition, studies have shown that the U5 mtDNA Haplogroup is found in 8.4% and 8.1% of Irish and Scots respectively, see **Figure 3**. A Western European origin for the test subject's maternal Eve is also reflected in the surnames of Mr Anthony's mtDNA genetic relatives which are dominated by British and Irish surnames, see **Figure 1**. More striking is the complete dominance of Irish surnames and locations *among the earliest recorded ancestors of the test subject's closest mtDNA genetic relatives*, see **Figure 4**.

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mtDNA Matches				
Genetic Distance	Last Name	Earliest Known Ancestor	mtDNA Haplogroup	Match Date
0	Johnson		U5a1b1a	6/7/2019
0	Gathright		U5a1b1a	3/6/2019
0	Jones		U5a1b1a	8/3/2018
0	Byrne	Ellen Sexton	U5a1b1a	6/6/2018
0	Hickey		U5a1b1a	5/2/2018
0	Smith		U5a1b1a	4/18/2018
0	Leaver		U5a1b1a	4/2/2018
0	Cheeseman	Honorah Breen, b. 1831	U5a1b1a	2/19/2018
0	Bilewski		U5a1b1a	9/21/2017
0	Tadman	Mary Hoare c1798 Swords, Dublin,	U5a1b1a	7/26/2017
0	Thompson		U5a1b1a	7/19/2017
0	Howe		U5a1b1a	4/11/2017
0	WALKER	Honor Geraghty, b. 1821 Tuam	U5a1b1a	1/31/2017
0	Todd	Sarah Dwyer, 1777 - 1872	U5a1b1a	12/28/2016
0	Mazza		U5a1b1a	8/10/2016
0	Edwards	Joanna Kennedy, b. abt 1785	U5a1b1a	3/3/2016
0	Young		U5a1b1a	1/22/2016
0	O'Meagher	Judith Cusack, c1820-unk, Lavey Cavan	U5a1b1a	10/21/2015
0	Walsh	Margaret Morgan, 1672-1755. Meath, Ireland	U5a1b1a	3/6/2015
0	Thomas		U5a1b1a	2/20/2015
0	Wentzel		U5a1b1a	2/17/2015
0	Soule		U5a1b1a	2/3/2015
0	Hanes		U5a1b1a	10/16/2014
0	Parent		U5a1b1a	10/16/2014
0	Memory	Ellen Jude, b. 1829 and d. 1894	U5a1b1a	10/9/2014
0	Dennett	Margaret Connors b.1788 approx	U5a1b1a	7/18/2014
0	Cook (Sims)	Maude Mary Haigwood, b1905 and d. 1996	U5a1b1a	6/25/2014
0	Ferguson	Ann Prittie, 1839-1926	U5a1b1a	4/18/2014
0	Carty		U5a1b1a	7/19/2013
0	Munnely	Anne O'Connell	U5a1b1a	7/1/2013
0	Stiff	Margaret McCarthy/?Donivan c.1790	U5a1b1a	11/19/2012
0	McMahon	ods Christina, b 1878, Carrickmacross Co Monag	U5a1b1a	1/11/2010
1	Husic		U5a1b1a	5/24/2019
1	Riley		U5a1b1a	5/13/2019
1	Lloyd	Dunn	U5a1b1a	3/23/2018
1	Awtry	Mary Gentles	U5a1b1a	1/8/2018
1	Thomson	Ann Rothwell B.1802 D. 1886	U5a1b1a	8/8/2017
1	Wallace	Margaret CRAIG b. Abt 1837 and d. Abt 1913	U5a1b1a	7/26/2017
1	Doherty		U5a1b1a	1/20/2017
1	Grissom		U5a1b1a	12/27/2016
1	Cavanagh		U5a1b1a	5/31/2016
1	Grafton	Mary Alice Hayes	U5a1b1a	5/11/2016
1	O'Brien	Elizabeth Stewart b1830 and d 1873	U5a1b1a	4/21/2016
1	Popel		U5a1b1a	4/21/2015
1	Harrison		U5a1b1a	4/9/2015
1	Christopher	Martha 'Mattie' Smith Crow, b. 1837	U5a1b1a	8/18/2014
1	Godwin		U5a1b1a	9/25/2013
1	Helton	Nancy Jane Childers b. 1828 District 12, Walker C	U5a1b1a	9/20/2013
1	Chang	Margaret McGraw, b. abt. 1835, Ireland	U5a1b1a	3/18/2013
1	McCraic	Emmet T. Flood, Chicago, IL	U5a1b1a	1/11/2010
2	Thomas		U5a1b1a	9/5/2018
2	Boggs	Rebecca Pierson	U5a1b1a	8/23/2016
2	O'Steen		U5a1b1a	5/20/2015
3	Stow		U5a1b1a	3/26/2012
3	Johnson	Charlotte McKee, b. 1769, VA, U.S.A.	U5a1b1a	3/17/2011

Figure 1: Snapshot of Mr Anthony's closest genetic matches as revealed in the mtDNA database. Mr Anthony has 55 genetic relatives with whom he shares a common U5a1b1a maternal ancestor (red box), some of whom reveal earliest known ancestral locations. The details revealed by his mtDNA matches are **NOT RANDOM**: their 'last names' are dominated by surnames of British and Irish origin; which confirms a European origin for his founding 'Eve.' Highlighted font denotes the ethnicity associated with each surname; **Irish**, **English/Welsh**, **Scottish**.

Anthony mtDNA Report

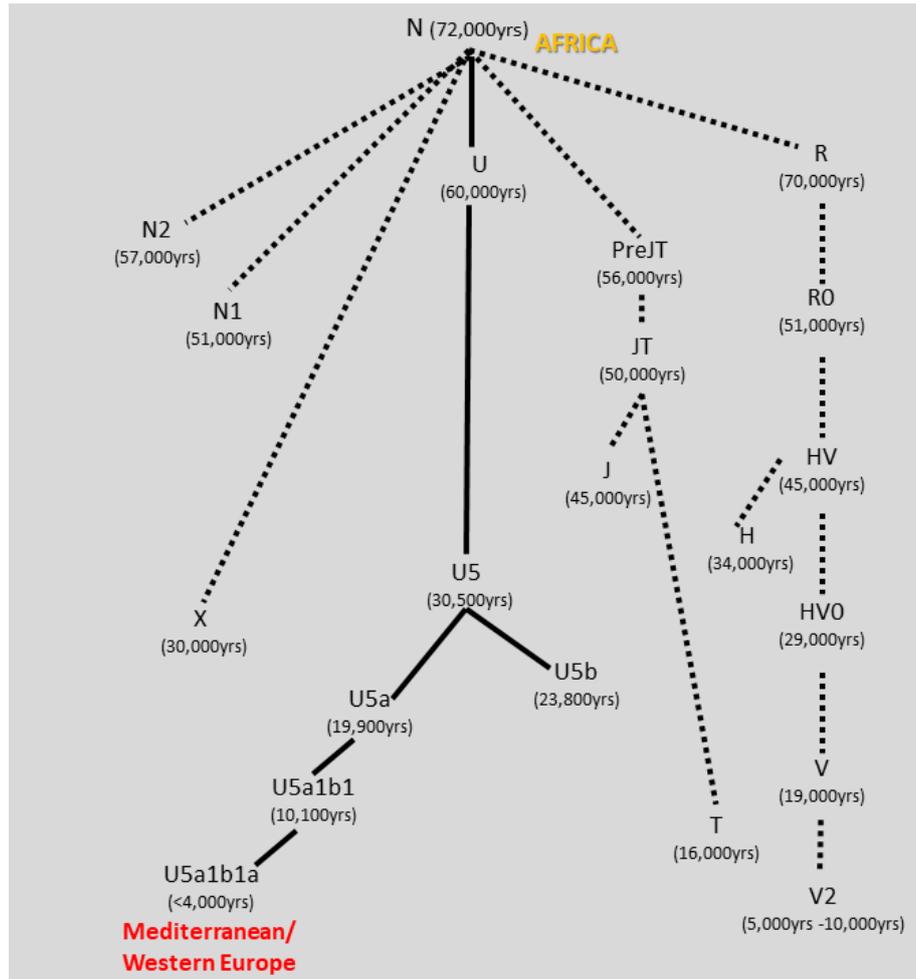


Figure 2: The human mtDNA evolutionary tree. The mitochondrial DNA (mtDNA) tree is a chart of human maternal relatedness showing how everyone's mitochondria stem arose from that of an ancient female ancestor (**N**) in Africa. Since then, her billions of descendants have accumulated novel mutations in their mtDNA. Mr Anthony's **U5a1b1a** mutation arose in a single female who lived somewhere in Western Europe approximately 4,000 years ago.

Country	mtDNA Haplogroup (%)																		
	L	HV	H	H1+H3	H5	HV0+V	J	T1	T2	U2	U3	U4	U5	U	K	I	W	X	Other
Scotland	0	0.2	44.1	25	3.1	3	12.7	2.2	5.9	1.2	1.1	2.8	8.1	2.4	6.9	4.1	0.6	2.5	2.4
Ireland	0	1.3	44.1	22.5	1.3	5.7	10.7	1.3	5.4	1.3	1	1.3	8.4	0.3	12	3	2.3	0.7	1.2

Figure 3: Frequency of mtDNA Haplogroups within Scotland and Ireland. Most human migration into Ireland has come via its nearest neighbour Scotland, and as a result there is some similarity with regards the frequencies of mtDNA Haplogroup within both nations. The test subject's U5a1b1a Haplogroup is slightly more common within Ireland compared to Scotland.

Table: https://www.eupedia.com/europe/european_mtdna_haplogroups_frequency.shtml

Anthony mtDNA Report

mtDNA Matches				
Genetic Distance	Last Name	Earliest Known Ancestor	mtDNA Haplogroup	Match Date
0	Ferguson	Ann Prittie, 1839-1926	U5a1b1a	4/18/2014
0	Munnelly	Anne O'Connell	U5a1b1a	7/1/2013
0	Memory	Ellen Jude, b. 1829 and d. 1894	U5a1b1a	10/9/2014
0	Byrne	Ellen Sexton	U5a1b1a	6/6/2018
0	WALKER	Honor Geraghty, b. 1821 Tuam	U5a1b1a	1/31/2017
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0	Todd	Sarah Dwyer, 1777 - 1872	U5a1b1a	12/28/2016
0	McMahon	Woods Christina, b 1878, Carrickmacross Co Monaghan	U5a1b1a	1/11/2010
1	Thomson	Ann Rothwell B.1802 D. 1886	U5a1b1a	8/8/2017
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2	Boggs	Rebecca Pierson	U5a1b1a	8/23/2016
3	Johnson	Charlotte McKee, b. 1769, VA, U.S.A.	U5a1b1a	3/17/2011

Figure 4: The earliest recorded ancestral locations reveal an Irish maternal origin. Approximately half of the test subject's mtDNA genetic relatives reveal earliest known maternal ancestors and associated locations. Strikingly those locations are **NOT RANDOM**; they are completely dominated by maternal ancestors with **Irish surnames** plus locations recorded within **Ireland**. These results confirm an Irish origin for the test subject's maternal Eve.

U5a1b1a mitochondrial Eve originated within County Meath

The earliest maternal locations revealed by the test subject's closest maternal genetic relatives are not random and reveal links with four bordering counties within Eastern Ireland, see **Figure 5**. Since surnames arose in an agrarian society, farmers with each surname can still be found concentrated in early census data in the area where their surname first appeared. One can therefore examine the distribution of the Irish *ancestral surnames* recorded by the test subject's mtDNA genetic relatives to determine whether they are associated with County Meath and its borderlands. Strikingly, almost all of the earliest recorded ancestral surnames revealed by his closest 1913 mtDNA matches are found within Meath or borderland counties, see **Figure 6**. The test subject's mtDNA results reveal that his maternal ancestor originated within County Meath in Eastern Ireland approximately 4,000 years ago.

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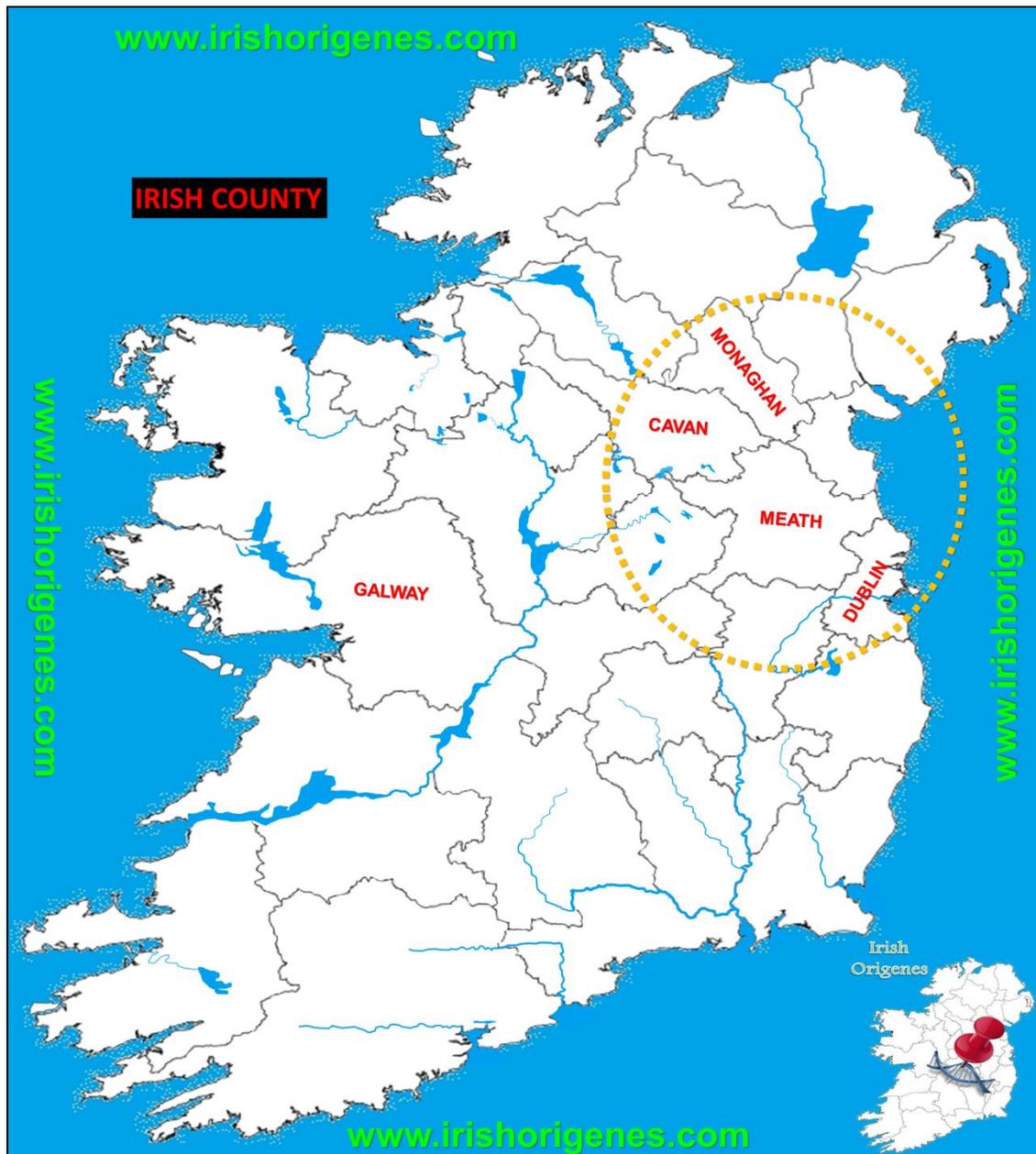


Figure 5: Irish Counties revealed by the test subject's closest mtDNA genetic relatives. The ancestral locations revealed among the test subject's mtDNA genetic relatives are NOT RANDOM. Of the 15 individuals that are an exact mtDNA match to the test subject, 5 record ancestral links to Irish locations; 4 of which are bordering counties within Eastern Ireland (**yellow broken circle**).

