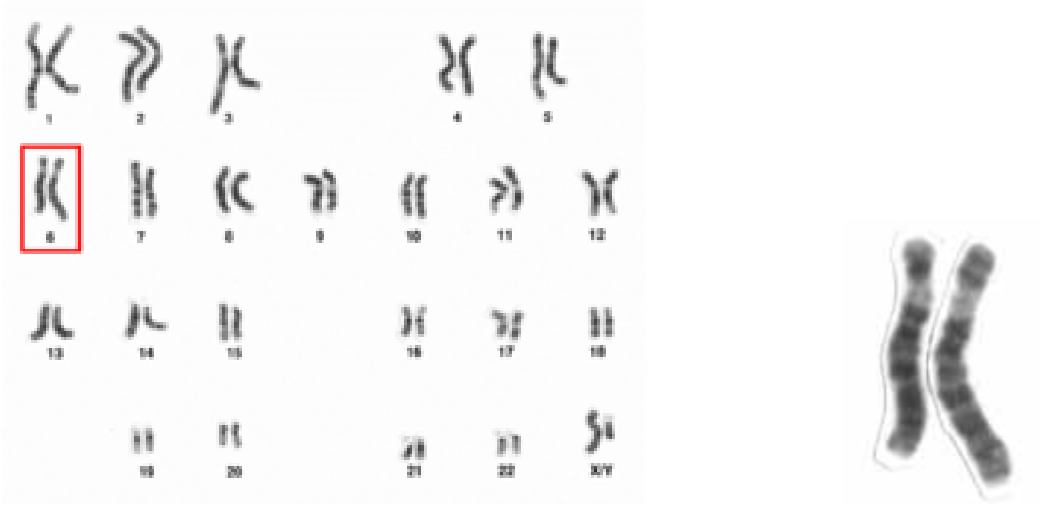
CHROMOSOME 6p: Inherited from 17th Century Paternal Great Grandparents of 5TH Great Grandfather Captain DANIEL YOUNG

Purpose: The present work is a study of the author's chromosome 6 and will illustrate how, despite what would be a rather low probability occurrence, the majority of the P end of the maternal chromosome 6, perhaps the single most important area to human functions such as immunity to pathogens, was inherited via his 5th great grandfather Daniel YOUNG born 1755 Canajoharie, New York. Daniel is the author's 5th great grandfather twice over due to a cousin marriage. The author will then demonstrate how it is possible to pinpoint the source of the segment even further back generationally. The evidence shows that Daniel Young's great grandparents Johann Andreas (born 1645) and Agnes (Clasen) Jung of Dunzweiler, Germany are the source of the segment.

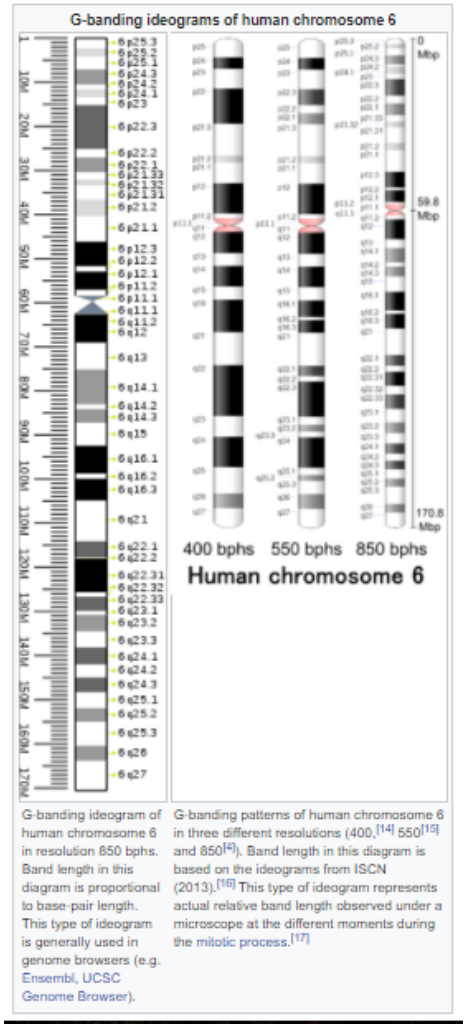
In this work the characteristics of p arm on chromosome 6, inherited by the author, will be explored, and further there will be a discussion of the genetic and genealogical significance of this region, as well as the pattern of inheritance which kept it intact (unrecombined) for so many generations.

Chromosome 6 - General :



Karyotype highlighting chromosome 6

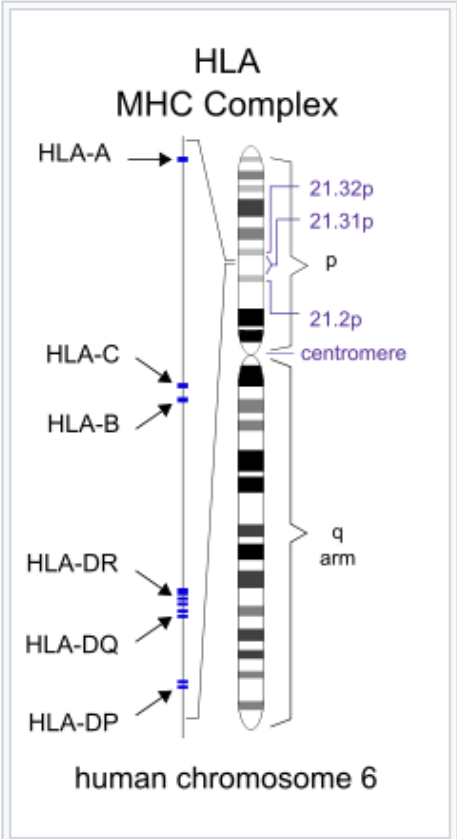
Chromosome 6 is one of the 23 pairs of chromosomes in humans. People normally have two copies of this chromosome. Chromosome 6 spans more than 170 million base pairs (the building material of DNA) and represents between 5.5 and 6% of the total DNA in cells."



G-banding ideogram of human chromosome 6 in resolution 850 bphs. Band length in this diagram is proportional to base-pair length. This type of ideogram is generally used in genome browsers (e.g. Ensembl, UCSC Genome Browser).

G-banding patterns of human chromosome 6 in three different resolutions (400,[14] 550[15] and 850[4]). Band length in this diagram is based on the ideograms from ISCN (2013).[16] This type of ideogram represents actual relative band length observed under a microscope at the different moments during the mitotic process.[17]

P End of Chromosome 6: The longer end of a chromosome is designated the "q" end (generally displayed at the right side or at the bottom of diagrams), while the shorter end (often depicted at the top or left side) is termed the "p" end or arm. The latter, between about 29 Mb and 33 Mb) which includes the Major Histocompatibility Complex [MHC] which contains over 224 genes (half known to have immune system functions), " related to the immune response, and plays a vital role in organ transplantation." Furthermore, considering the "p" end, "The human leukocyte antigen [HLA] lies on chromosome 6, with the exception of the gene for β2-microglobulin (which is located on chromosome 15), and encodes cell-surface antigen-presenting proteins among other functions." It is located at various positions within the above 3.6 Mb segment (as seen in the chart below).



HLA region of Chromosome 6

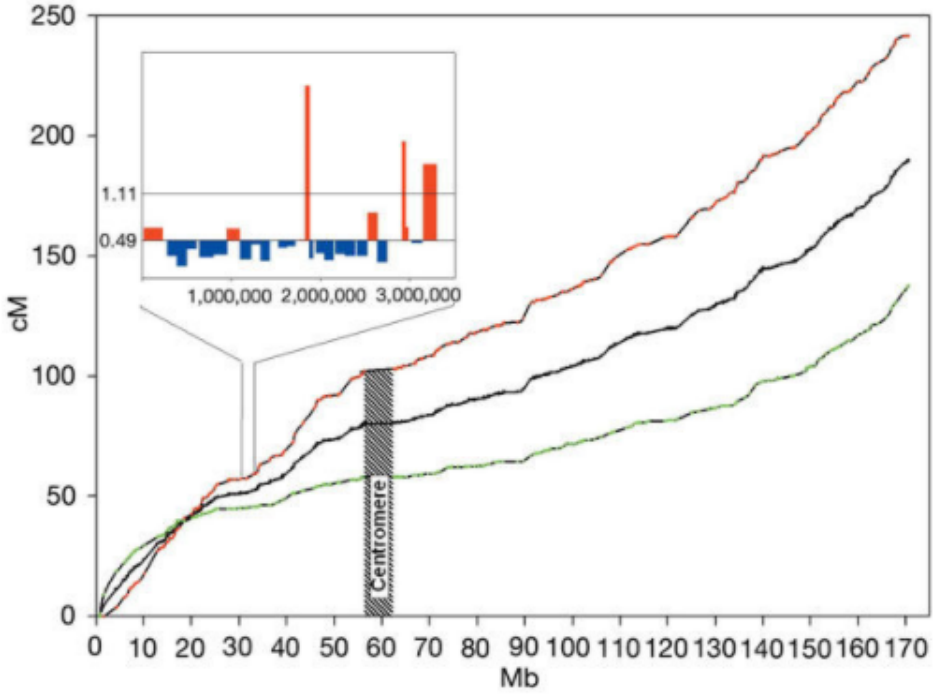
"In 2003, the entirety of chromosome 6 was manually annotated for proteins, resulting in the identification of 1,557 genes, and 633 pseudogenes." The article written in Nature is definitely worth reading, but is too long to summarize here. What might be useful, however, is to list all the genes located on the segment noted in this manuscript which extends from 6p12.3 to 6p23:

G-bands of human chromosome 6 in resolution 850 bphs

6	p	24.1	592	740	11,600,001	13,400,000	gpos	25
6	p	23	740	844	13,400,001	15,200,000	gneg	
6	p	22.3	844	1185	15,200,001	25,200,000	gpos	75
6	p	22.2	1185	1348	25,200,001	27,100,000	gneg	
6	p	22.1	1348	1585	27,100,001	30,500,000	gpos	50
6	p	21.33	1585	1718	30,500,001	32,100,000	gneg	
6	p	21.32	1718	1836	32,100,001	33,500,000	gpos	25
6	p	21.31	1836	2162	33,500,001	36,600,000	gneg	
6	p	21.2	2162	2310	36,600,001	40,500,000	gpos	25
6	p	21.1	2310	2755	40,500,001	46,200,000	gneg	
6	p	12.3	2755	3080	46,200,001	51,800,000	gpos	100
6	p	12.2	3080	3140	51,800,001	53,000,000	gneg	

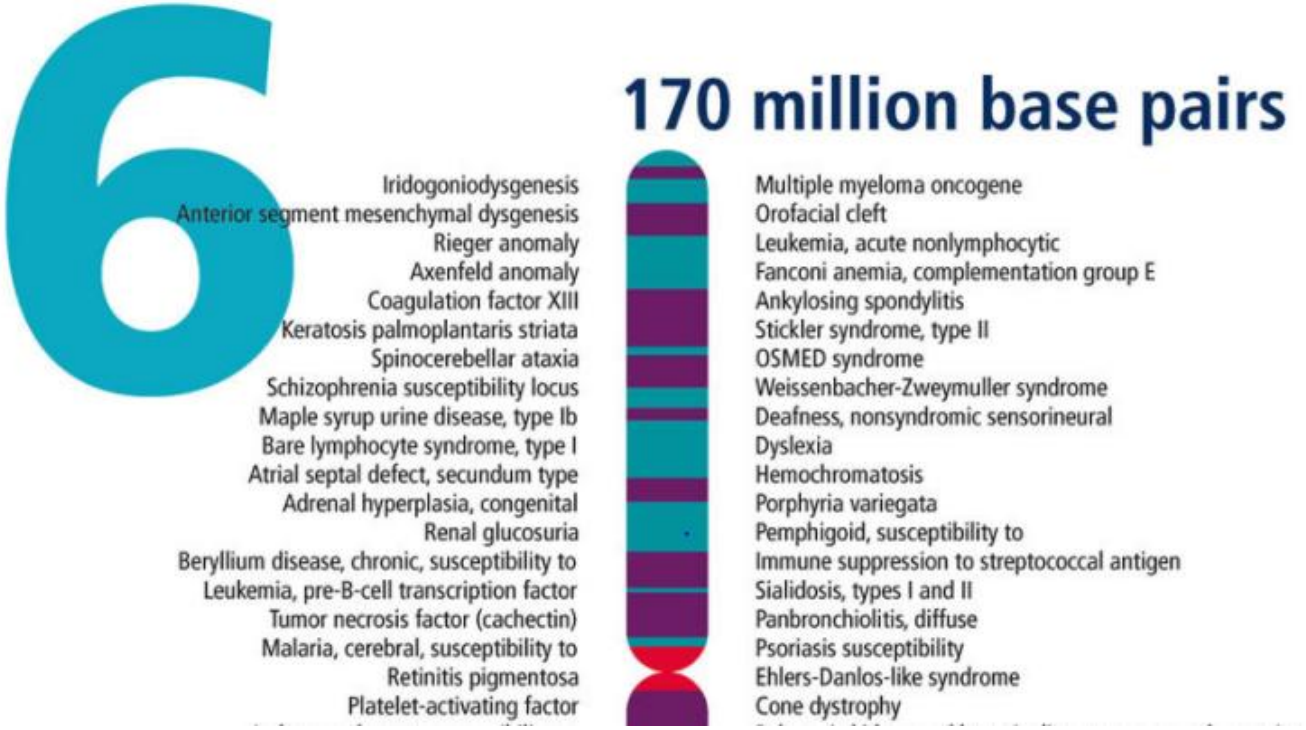
The original article in Nature (2003) states that, "The classical MHC, a 3.6 Mb region at 6p21.3, has an overall low sex-averaged recombination rate across its length in the genetic map." This represents about a tenth of the total length of the inherited segment. So a rather larger gene set can be added to the immune system – related genes. Below is a good visual showing the inherited section in relation to the whole chromosome (including the gene poor centromere where the p end transitions into the q end of the chromosome).

Figure 3: Alignment of the genetic markers in the deCODE linkage map[3] with the chromosome 6 sequence.



The physical position of each genetic marker on the female, the male and the sex-averaged genetic map is indicated. Inset, high-resolution recombination intensity across the 3.6 Mb classical MHC region at 6p21.3 (ref. 17).

Diseases Associated with the "P" End of Chromosome 6:



Genealogical DNA Data – Gedmatch, 23andMe, MyHeritage & FTDNA:

Chromosome	Position (Mb)		cM	SNPs	Person	Ancestor(s) in Common	G G Grandparent(s)	Position of Match
6	148,878	14,880,878	29.8	4,958	John Williams	George Dawson (1827) & Mary Ann Dunham	John Dawson	FTDNA
6	14,349,114	34,072,735	22.4	22,272	Carol Stowe	John Dawson & Hannah Adelia Young	Hannah Adelia Young	MyHeritage

6	14,778,866	23,775,185	14.2	1,733	James Price	Daniel Young (1755) & Elizabeth Windecker	Hannah Adelia Young	
6	14,889,846	32,888,295	18	10,200	Donna Pickard	Nicholas Pickard (1701) & Anna Barbara Weiser??	Hannah Adelia Young	FTDNA
6	14,889,846	42,110,845	31.8	13,665	Lillian Harn	Johann Andreas (1645) & Agnes (Clasen) Jung via dau Anna Margaretha (Jung) Zimmerman	Hannah Adelia Young	FTDNA
6	14,903,941	22,488,063	12.0	2,090	Audrey (Betty) Elizabeth Cuppy	Elizabeth Young (1827)	Hannah Adelia Young	
6	14,919,298	22,812,384	12.6	2,176	Robert C Nelson	Elizabeth Young (1827)	Hannah Adelia Young	
6	15,002,519	22,488,063	11.8	2,108	Kay Montgomery Rumney	Elizabeth Young (1827)	Hannah Adelia Young	
6	17,813,825	41,905,275	26.9	7,344	Elizabeth Lohff	Johann Andreas (1645) & Agnes (Clasen) Jung via dau Anna Margaretha (Jung) Zimmerman	Hannah Adelia Young	23andMe
6	23,339,275	43,889,896	22.7	3,944	Rebecca Fox	Johann Andreas (1645) & Agnes (Clasen) Jung via dau Anna Margaretha (Jung) Zimmerman	Hannah Adelia Young	

6	27,216,848	41,936,010	14.6	18,688	Allan Young	Johann Andreas (1645) & Agnes (Clasen) Jung via son Johann Nickel Jung	Hannah Adelia Young	MyHeritage
6	29,922,386	41,665,907	13.7	15,360	Phylip Young	Johann Andreas (1645) & Agnes (Clasen) Jung via son Johann Nickel Jung	Hannah Adelia Young	MyHeritage
6	32,827,644	46,683,408	21.3	4,610	Norm Sones	Elizabeth Young (1827)	Hannah Adelia Young	
6	37,329,651	42,110,845	7.9	1,465	Robert W. Mays	Johann Andreas (1645) & Agnes (Clasen) Jung via Anna Margaretha (Jung) Zimmerman	Hannah Adelia Young	FTDNA
6	40,500,347	46,779,231	12.4	1,762	Dan Nelson	Elizabeth Young (1827)	Hannah Adelia Young	
6	40,500,347	46,548,516	12.2	1,576	Robert C Nelson	Elizabeth Young (1827)	Hannah Adelia Young	
6	40,500,347	44,382,989	8.5	1,095	Audrey (Betty) Elizabeth Cuppy	Elizabeth Young (1827)	Hannah Adelia Young	
6	40,512,992	46,545,180	12.2	1,610	Kay Montgomery Rumney	Elizabeth Young (1827)	Hannah Adelia Young	

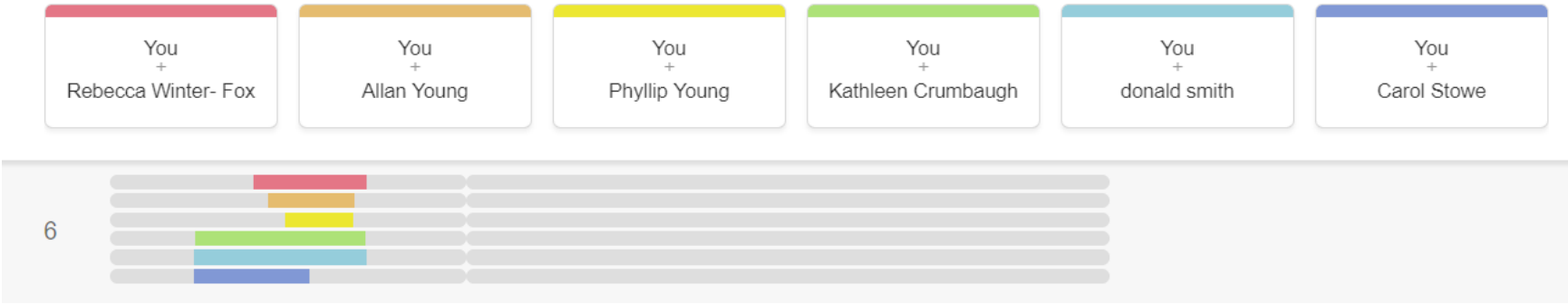
Genetic Sharing Data – Family Tree DNA: The author's segment sharing – visual display:

DAWSON: John Williams (green)

YOUNG: Robert Charles Nelson (blue) and Lillian Harn (red)

Note the sharp delineation at the junction of the Dawson and Young segments illustrating where the join via a recombination occurring during meiosis in the author's great grandfather Joseph William Dawson where the tip of his father John Dawson's chromosome 6 was melded with the adjoining part from his mother Hannah Adelia (Young) Dawson. The combined segments were subsequently passed as a single segment (no further recombination) to his daughter Eva Fern (Dawson) Williamson, to Violet May (Williamson) Faux, then to the author.

<u>Genetic Sharing Data – MyHeritage</u>:



Note that the author along with Rebecca Winter-Fox (noted above as a Johann Andreas Jung (1645) and Agnes Clasen match), as well as Kathleen Crumbaugh and Donald smith share the end of segment; while the author, Kathleen Crumbaugh, Donald Smith, as well as Carol Stowe (descendant of Clarissa Jane (Dawson) Stowe, sister of the author's great grandfather Joseph William Dawson) share the beginning of the full segment. At present it is not known how Kathleen Crumbaugh and Donald Smith "fit" into the Young picture.

What is perhaps most interesting is that the ancestry of Allan Young and Phyllip Young (brothers) can be traced to an ancestor (twice over via cousin marriage) Theobald Jung (born 1837 Ehweiler, Kusel, Germany) who came to Ohio about 1850. Theobald's ancestry

can be documented via the parish registers through many generations in Ehweiler, then a Johann Peter Jung born in Albessen the next village to Ehweiler, and Konken (where his grandparents Hans Andreas Jung and Agnes Clasen were married in 1666), who is the son of Nickel Jung. Nickel (Johann Nicholas) was the eldest son of Hans Andreas and Agnes and stayed in Germany when most of his siblings migrated to America in 1709.

Thus there are matches with descendants of three children of Hans Andreas JUNG and Agnes CLASEN – Hans Nickel JUNG born 1667, Anna Margaretha (JUNG) Zimmerman born 1669, and Johann Theobald JUNG born 1691.

Inheritance of 6p in the Author and Various Relatives:

1) As the data above illustrates, the evidence clearly indicates that the author has inherited the segment beginning at the telomere at the p end of chromosome 6 Mb to about 14.8 Mb from his great great grandfather John Dawson.

2) The adjoining segment, from about 14.5 Mb and ending about 47 Mb – about 33 Mb in total, matches individuals whose genealogy is known and demonstrates that this DNA came from the author's great great grandmother Hannah Adelia (Young) Dawson via her great grandfather Daniel Young.

3) The fact that the MHC – HLA region between about 20 Mb and 33 Mb seldom experiences a recombination event. The above genealogical chart shows the segment the author shares with Donna Pickard ending at 32.9 Mb, and the segment that the author shares with Norm Sones begins at 32.9 Mb – the end of this key region.

Genealogy Considerations: There are four genealogies re the above which speak to the generations previous to Daniel and Elizabeth (Windecker) Young – and are consistent with the author's genealogy – with one exception. While Donna Pickard's lineage merges at Nicholas and Anna Barbara (Weiser) Pickard, she has many more unknown Mohawk Valley ancestors, and probably one is a Young or Zimmerman. All the other matches trace their lineage via Zimmermans - Marvin Zimmerman (1836 – 1930) the ancestor of Robert W. Mays; and another son (Marvin's brother) William J. Zimmerman (1842 – 1927) the ancestor of Lillian M. Harn and Elizabeth Lohff. All have a genealogical connection extending back to Johann Andreas (born 1645) and Agnes (Clasen) Jung. However all also have an ancestral connection with George (born 1715) and Elizabeth (Walrath) Windecker.

The "tie breakers" here (Young or Windecker?) is Rebecca Winter-Fox who has a more constricted ancestry in the Mohawk Valley (not as many Palatine ancestors), but an extensive genealogy. Her Zimmerman ancestor was Catharine Zimmerman born Herkimer County in 1836 to Conrad Zimmerman, a line which also ends with Johann Andreas and Agnes (Clasen) Jung via their daughter Anna

Margaretha Jung who married Johann Jacob Zimmerman of Dunzweiler – the progenitor of the Zimmerman families of the Mohawk Valley. There is apparently no Windecker ancestor. Also, and in particular, the 4 Young siblings from Ohio (two noted above) who have no Mohawk Valley connection but have Young ancestors who came directly from Germany in the mid 19th Century clearly point to a "Young only" segment.

Thus the conclusion is that the segment has a "Young origin" from Johann Andreas and Agnes (Clasen) Jung of Dunzweiler, Germany, to Johann Theobald Jung, to son Johann Adam Young to his son Daniel Young, eventually reaching the author. Since one of the matches, James Price, is a descendant of Daniel Young via Catherine (Young) Wintemute, Daniel is the likely source of the author's matches here. Johann Adam Young is also an ancestor via his eldest son Lt. John Young of the Six Nations Indian Department whose son Abraham Young's daughter Rachel Young (1800 – 1848) married her first cousin once removed, Henry Young Sr., son of Daniel Young.

Physiological Relevance of the Segment: This latter segment includes the MHC / HLA region which is gene rich and regulates the human immune system. It is somewhat eye opening to realize that this area, can be shown to have been inherited from the ancestors in common for all the above individuals - a couple born in the mid 1600s in Dunzweiler near Zweibrucken, Germany. The segment is critical to daily functioning from fighting off a cold to ensuring that cancer cells are destroyed before they can multiply and create a tumor. An over active immune system can cause conditions such as psoriasis. Thus a haplotype (version of the array of genes that regulate the system) that is formidable or even predisposes towards homeostasis is something that ancestors from generations past have given to their distant descendants. There is of course a paternal chromosome (chromatid) 6 too. In the case of the author, the maternal segment from this key region has a known provenance, and the author can "thank" Daniel Young for at least some of his ability to battle infections. Oddly, the author very seldom gets a true cold (at least not since young adulthood). Can he thank his mother, his father, or "other factors" (e.g., the epigenome – created in part by the experiences of his parents and ancestors)? Perhaps some of the immune response can be traced directly to Daniel.

Summary: The author appears to have inherited the largest part of the "p" section of chromosome 6, 14.8 to 46.8 Mb, from Johann Andreas Jung and Agnes Clasen of Dunzweiler, Germany who are the parents of the Palatine emigrant Johann Theobald Jung (1691 – 1761). One fact that is worth noting is the sharp almost seamless transition at the recombination point between a segment beginning at the telomere of the p end and ending at about 14.8 Mb. This is the contribution of great great grandfather John DAWSON, where it merges at this point with the section transmitted by his wife, great great grandmother Hannah Adelia (Young) Dawson.

It is noteworthy that a segment of 33 Mb has been given over 9 opportunities to recombine during the process of meiosis in each generation (formation of eggs and sperm), but never did so (in the author and Lillian Maudine Harn and Elizabeth Lohff) to split this segment into a smaller unit or have it disappear altogether. There are many more individuals who share the same amount with the author on both 23andMe and FTDNA (and doubtless Ancestry – but they do not display segments for matching individuals), but none have a shred of genealogical information to help obtain more specificity in terms of the origin of the segment. The sheer number of individuals who match on this segment, with multiple matches to individuals who have tested at each of the 4 major DNA testing companies suggests some sort of "persistence" factor involving this key segment of DNA (immune system genes).

On average in female recombination there are 1.6 per chromosome with each meiosis, and 1.0 with males and so it is fortunate indeed that for whatever reason (chance most likely – and the fact that this couple are ancestors in three branches of the author's tree; and two in that of the 4 Ohio siblings) the author has a large segment, of particular importance, where we can say with certainty its point of origin (in Germany since all parties were of German descent). Since the author's sister does not share this segment, but does share the segment which begins at the end point (about 47 Mb) and crosses the centromere to the "q" arm, along with a known Williamson relative, therefore the following segment was received by the author and his sister from Gilbert Williamson, our grandfather and the husband of our grandmother Eva Fern (Dawson) Williamson.

Curiously, the Gedmatch analysis suggests that in addition to the author's sister, their maternal uncle, first cousin, and second cousin also did not inherit the above described segment from their Young ancestors. It is clear, however, that each of them inherited many segments from Daniel and Elizabeth which the author did not. However, the author's second cousin twice removed, Robert Charles Nelson, shares both the very beginning and the very end of the segment, but with the mid section not shared. DNA inheritance is a very "chancy" / largely random business.

It is concluded that the segment came to the author via Sgt. Daniel Young of Butler's Rangers. Since his sons Henry and George were both sergeants in their father's (Captain Daniel Young) regiment during the War of 1812, it is interesting to realize that this was DNA that the author's ancestor carried through all the trials and tribulations of each of these conflicts (in which they played a major part). However, which of the two sons is the most likely candidate donor? Considering the long list of individuals noted in the chart above who are known to be descendants of Elizabeth (Young) Young born 1827, but not her husband (and also ancestor of the author) Henry Young Jr. born 1825, the probable source is George Young (born 1796), father of Elizabeth.

One might speculate that this segment on chromosome 6 gave the ancestor resistance to the pathogens which affected many others at the time. Thus, the author wonders if he has that same genetically driven profile that influences resistance to germs, and some

disorders such as psoriasis (an auto – immune disease), and how much influence the other genes on this segment have – and of course the role of the homologous paternal (father's) segment. The specifics would take considerable study, and over time the author will come to find out exactly which genes on each chromosome come from which ancestor (as far as is possible at this time) – and who he can "thank" for this or that trait or predisposition.

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20 December 2017, 2 July 2019.