Genetic Genealogy in Action

Using DNA Evidence To Solve Family Tree Mysteries



Gerri Berger, Genetic Genealogist

Share your mysteries...

- What family mysteries are you hoping to solve?
- Who are you searching for?
- What are your brick walls?
- Why did you DNA test?
- Surprises?

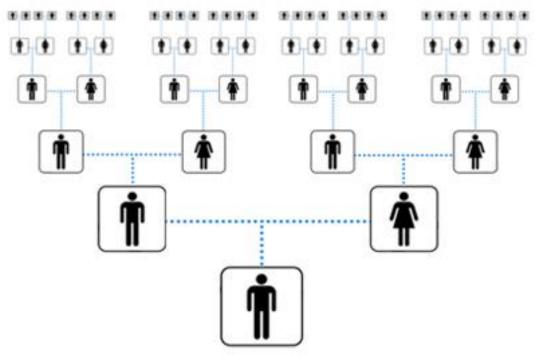


Mysteries and Method

- Cases of unknown parentage
 - Adoptees
 - Foundlings
 - Donor conceived individuals
 - Raised by one biological parent other parent unknown
- Cases of unknown DNA matches
 - I have a first cousin and don't know how he/she is related to me
 - They ARE genetically related to you
- Brick Walls
 - My family tree research has dead-ended with particular ancestor(s)
- No matter your mystery, the method is the same

Traditional Genealogy

- A line of descent traced continually from an ancestor
- The study of families by researching and tracing their history and lineage through historical records and other sources



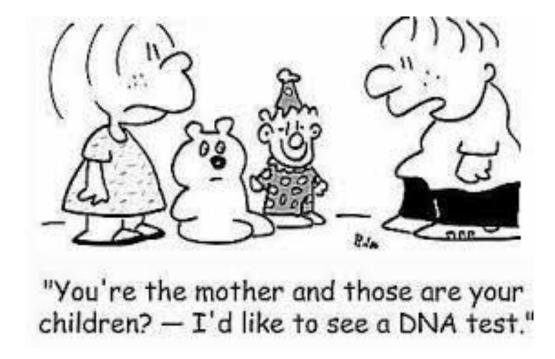
Genetics

- The study of heredity and the variation of inherited characteristics.
 - How the characteristics and qualities of parents are passed down to their offspring, through their genes.



How are genetics and genealogy used together?

 Genetic genealogy is the use of DNA evidence in combination with traditional genealogy and historical records to infer relationships between individuals.

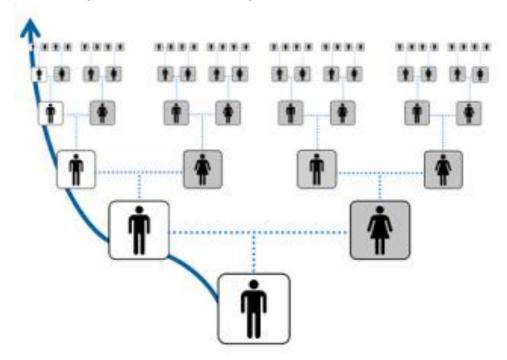


DNA Testing

- There are 3 types of DNA tests used in Genetic Genealogy
 - Y-DNA (FTDNA)
 - mtDNA (23andMe; FTDNA)
 - Autosomal DNA (AncestryDNA, 23andMe, FTDNA, MyHeritage)

Y-DNA Testing

- Y-DNA testing traces the paternal line
- Y-DNA runs narrow and deep
- Only men can test (only men carry the Y chromosome)

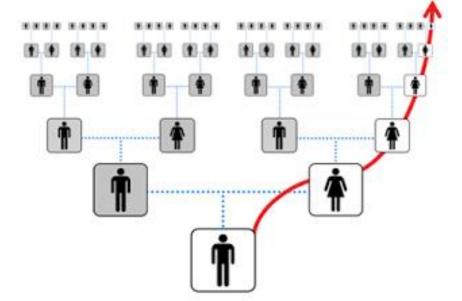


mtDNA Testing

- mtDNA or mitochondrial DNA testing traces the maternal line
- myDNA runs narrow and deep

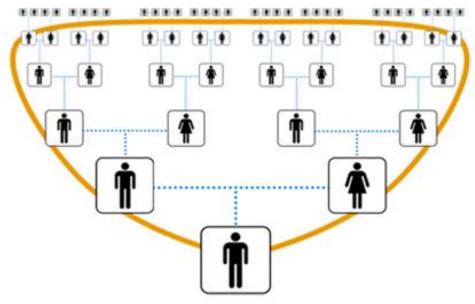
• Inheritance pattern: Mother's pass their mtDNA to both their sons and daughters; only their daughters pass it forward. Both men and

women can test



Autosomal DNA Testing

- Autosomal DNA testing includes inherited genes from both parents
- It includes random contributions from parents, grandparents, etc.
- Autosomal DNA runs wide and shallow (6 gens 4th cousins)
- Both men and women can test



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DNA Testing

• THE BIG FOUR

Unique features; advantages / disadvantages

 Cast your genes into all the major "DNA pools" as well as GEDmatch (genesis.gedmatch.com)





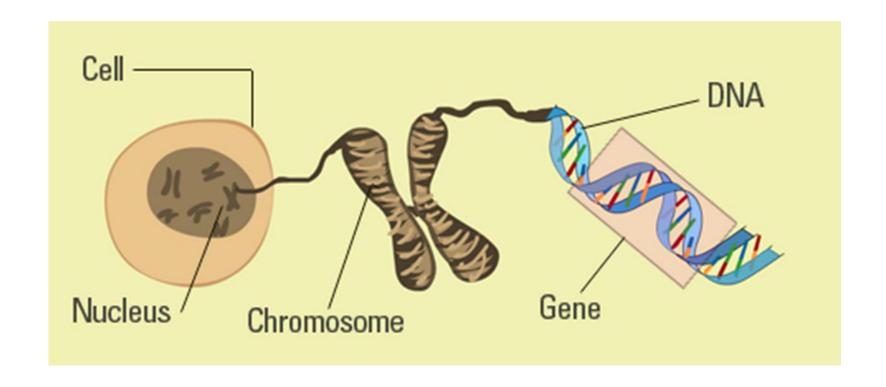






Crash Course in Genetics

• CELLS: The basic building blocks for all living things



Glossary of Terms

CHROMOSOMES

 Threadlike structures of nucleic acids and protein found in the nucleus of most living cells, carrying genetic information in the form of genes

GENES

 Basic Units of heredity (linear sequence of nucleotides – a DNA segment)) which is transferred from a parent to offspring and is held to determine some characteristic of the offspring

MATCHING DNA SEGMENTS

 When a particular segment of DNA on a particular chromosome matches to another person (each person inherited an identical segment(s) of DNA from a common ancestor)

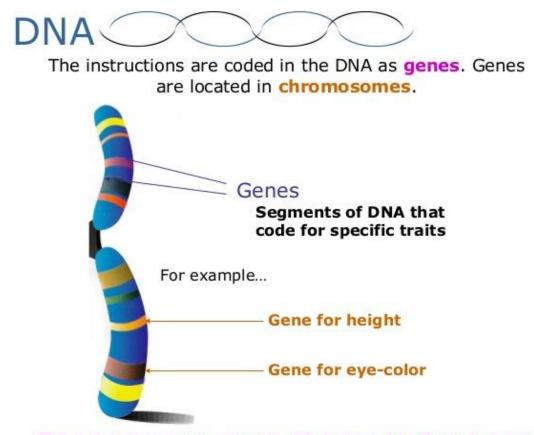
HALF IDENTICAL REGION (HIR)

• A region of two paired chromosomes where at least one of the two alleles from one person's pair of chromosomes matches at least one of the two alleles from a different person's pair of chromosomes throughout the entire region. A half-identical region may be either identical by descent (IBD) or identical by state (IBS).

CENTIMORGANS

• A map unit used for measuring genetic linkage – used to express the distance between two gene loci on a chromosome (start/end)

Chromosomes and Genes



This is not an accurate example. It's just used to illustrate a point.

Three Little Letters – One Big Name

- **DNA** (dioxyribonucleic acid): a molecule composed of two chains that coil around each other to form a double helix carrying the genetic instructions used in the growth, development, functioning, and reproduction of all known organisms and many viruses.
- Your DNA is the "instruction manual" for how to make YOU
- We are all 99.5% genetically identical... it's true!
- DNA doesn't lie... it just is what it is.

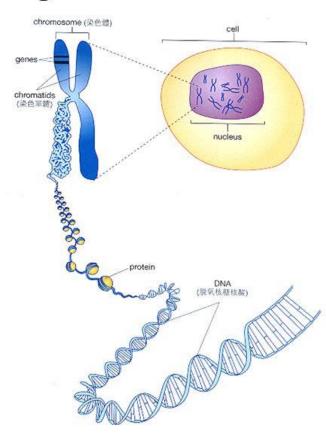
Structure of DNA

- The structure of the double helix is like a ladder, with the base pairs forming the ladder's rungs
- 4 chemical bases pair up and attach to form the rungs of the "ladder"
 - Adenine / Thymine
 - Guanine / Cytosine
- Human DNA consists of about 3 billion bases
- More than 99% of those bases are identical in all people
- ► Those bases pair up to form about 3.2 billion base pairs
- The order, or sequence, of these bases determines the information available for building and maintaining an organism(aka you), similar to the way letters of the alphabet appear in a certain order to form words and sentences.
- When they attach to a phosphate molecule and a sugar molecule they (the base pairs) become nucleotides
- Nucleotides are arranged in two long strands that form a spiral called a double helix

Bringing it all together...

Structural relationship among chromosomes, DNA and genes

- 1. Cells are the basic building blocks of all living things.
- In a cell, DNA (deoxyribonucleic acid) is packaged in chromosomes within the nucleus.
- 3. DNA is a large, polymeric molecule.
- A gene is a segment of DNA molecule of a chromosome. It is the basic unit of heredity. Genes determine the body characteristics of an organism.
- Each inherited characteristic is controlled by one or several genes.



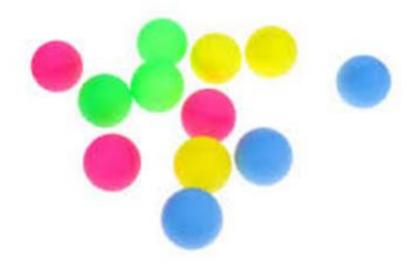
DNA: 50% Mom and 50 % Dad



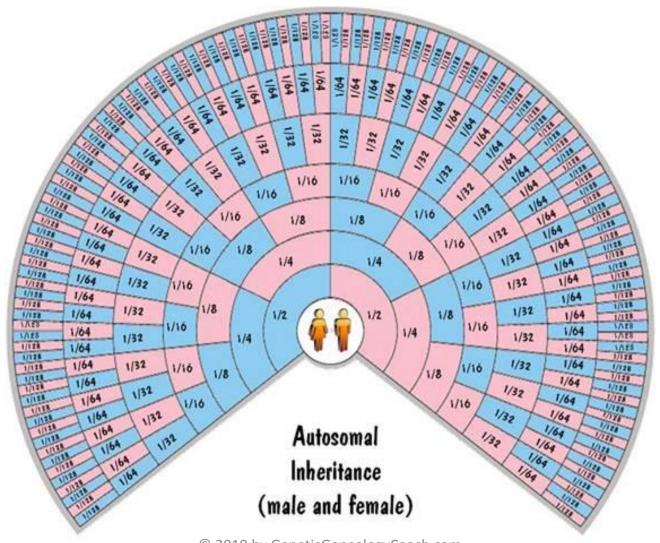


How it plays out in Genetic Genealogy...

- 50% of Mom and 50% of Dad (Gen 2)
- 25% of each grandparent (approx. from here on down) (Gen 3)
- 12. 5% of each gr-grandparent (Gen 4)
- 6.25% of each 2nd gr-grandparent (Gen 5)
- 3.125% of each 3rd gr-grandparent (Gen 6)
- 1.56% of each 4th gr-grandparent (Gen 7)
- .78% of each 5th gr-grandparent (Gen 8)



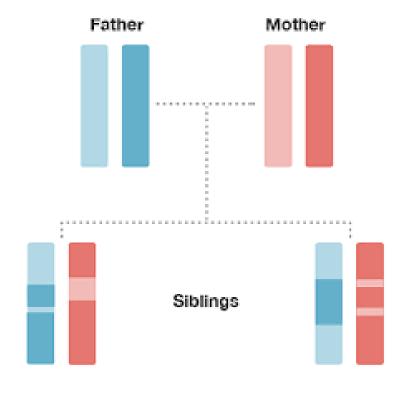
Autosomal DNA Inheritance



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Genetic Recombination

- What is it and how is it relevant to genetic genealogy?
 - During recombination, chromosomes physically swap segments to generate new combinations of genetic loci without changing their order.



Richard Cole's Cold Case

• "In all of us there is a hunger, marrow-deep, to know our heritage- to know who we are and where we have come from. Without this enriching knowledge, there is a hollow yearning. No matter what our attainments in life, there is still a vacuum, an emptiness, and the most disquieting loneliness." ~ Alex Haley

Articles from the front page of the AJC, 7/3, 7/5, 7/5 of 1944

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leased ort Area published tion about ell plant

ed by Gil-

transporles to the

By ROLFE EDMONDSON. "Baby Boy," who was abandon-to call him only "Baby Boy." ed Sunday in a local hotel by his

hospital

that mother love, something he ap- and what he has never had-a parently never knew from his real | mother's love." mother, for she abandoned him when he was only two or three weeks old. .

Nurses in the maternity ward, Atlanta where "Baby Boy" is confined, line is are showering affection on him, and are tenderly caring for him at all hours of the day and night. In fact the dozen nurses on duty in that ward are calling themselves his foster mother and no child ever received the attention which ol will they are showering on him. equest NURSES LOVE CHILD

school They are united in their love Mrs. for the child; they are united in sident, the tender and scientific care he receives, but there's one thing the they can't agree on, and that's a nd to name for "Baby Boy."

Each one of the nurses has a chool special name she wants to bestow waste on him, but then they know that ought all will be confusion if the child o. m. tries to go through life with the and save a lot of money on houseto give him, so the nurses have building materials.

Baby Boy' Abandoned in Hotel
Is Mothered by Grady Nurses

| held a little conference, agreed "Of course the time will come," mother, now has nearly a dozen one of the nurses said yesterday, when Baby Boy" will have to "Baby Boy," left at the hotel by leave us, and be adopted into a his mother, a slender, neatly dress- good home. Then he will take the ed blonde woman of about 18, is name of the family adopting him. waxing fat in his crib at Grady We hate to think of that day of departure, and until then, we are And "Baby Boy" is not missing going to give him what he needs

GAINS 5 OUNCES

LATIN-AMERICAN "JUGTOWN"—Ensign T. B. Bogges, of Charleston, studies a Diego Rivera print, which is one

of 54 on exhibit at the High Museum of Art through July

15. The prints are shown as an artistic expression of

15. The priving among Pan-American "good neighbors."

When taken to the hospital, "Baby Boy" weighed exactly seven pounds. Now he weighs seven pounds, five ounces. That's a gain of exactly an ounce a day, which the nurses point out, is exactly normal.

In the meanwhile, City Detectives S. C. Dillingham and T. J. Milligan, who were assigned to seek and prosecute a mother so heartless that she could and did abandon her child, struck a blank wall in their search when they received a telegram from police officials of Salt Lake City, stating that no Mrs. Richard Parker was known there.

That was the name and the home city given by the mother when she registered in the hotel.

Watch Constitution Want Ads will dozen or more names they want hold goods, office equipment and







S. A. Ellison.



Benefits City

By DR. THOMAS M. ELLIOTT. Any kind of great convention that brings to Atlanta \$25,000 day for five days is a worthwhile enture, to say nothing of Il ugher values in a cultural am monal sense. The southeastern ju risdictional conference just held in Atlanta is conservatively estimated to have brought that sum to Atlanta during the five days it was in session here.

The material value connected with the conference are insignifi cant in contrast with the lasting values that affect thought, life and morals, according to the esti-mate of Bishop Arthur J. Moore, resident Methodist bishop and president of the two Georgia Methodist conferences, as stated by him yesterday.

"The jurisdictional conference demonstrated effectively that Methodists of the southeastern section can have a large gathering of representative leaders among laymen and ministers, en-act legislation that is conducive to the religious life of the south and promote a program that is inspiring and challenging," said Bisnop

BISHOP'S COMMENT

The bishop cited the fact that the conference is composed of men and women who are familiar at close range with southern conditions and capable of executing the entire denominational program more effectively than those at a great distance.

Another fact cited is that the election of bishops by the jurisdictional conferences brings that work closer to the people so that they may have more intimate and through knowledge of the men chosen to preside over them.

Possibly the largest constructive contribution made by the jurisdictional conference is the setting up of a council for the entire jurisdiction. The idea of a jurisdictional council originated in Atlanta and will no doubt be ado; ted eventual ly by all the jurisdictions, as it has been already in the south central area.

WORK OF COUNCIL.

Simply stated, the jurisdictional council is to be a continuing group whose function will be to promote the denomination's interests most effectively, give special study to the problems of the southeast and more quickly bring adjustment to our people.

Membership in the jurisdictional council will be about 65. All bishops in the jurisdiction are members of the council, together with all chairmen and secretaries of the numerous boards and commissions. In addition to all the bish ops and secretaries and chairmen there will be two representatives . a minister and a layman from each of the 18 annual conferences affiliated with the jurisdiction Seventeen of the annual confer ences are distinctly southern, will the Cuban conference making the eighteenth. Bishop Art



Constitution Staff Photo-B. W Callawar

BABY BOY-?--They don't know his name, but nurses at Grady hospital are taking good care of this little fellow. He was found by the chambermaid at the Robert Fulton hotel Sunday a couple of hours after his youthful mother registered from a city in Utah and left him. The canvas bag containing a few clothes and directions for preparing his formula constitute his only worldly goods.

Dear Mommy:

This is just to let you know that I am all right. The maid at the Robert Fulton hotel found me just a little while after you left-and she read your note and fixed my bottles for me every two hours. They kept me all day in the room you rented because the manager said you had paid for it in advance and you might be back.

Now I'm in a little haby bed in the children's ward at Grady hospital. They're not sure who I am so they couldn't write my name on the card hanging at the foot of the bed. They don't even know how old I am for sure. They just guess at two weeks or six weeks-and every now and then somebody stops and looks at me and says, "How could a mother walk off and leave such a little baby?" or, "Isn't he the best baby? He never cries!"

The doctor said I was well but awfully thin-and they let me sleep all the time. The blue canvas bag you left still has my diapers and some powder and a box of "Joy" nipples in it. Some people seem to think finding anything called "Joy" in my belongings is kind of funny. But I don't reckon joy will be as hard for me to find as it will be for you.

They say the hospital social workers will find somebody to adopt me and give me a regular home and a full time motherbut what about you? The room clerk at the hotel said you were awfully young, just 18 or 19 years old, and that you looked terribly tired when you walked into the hotel and asked for a room. He said, "I never saw anybody who looked like she needed a

Please take care of yourself, mommy, wherever you are. And don't worry about me. I'm going to be all right.

"BABY BOY---- "

(Written for him by Celestine Sibley.)

THE WEATHER

Mostly cloudy and moderately warm Tuesday with showers. Ex-pected high, 84. Details on Page

High, 83; low 64 High, 74; low, 64



ATLANTA (2), GA., MONDAY EVENING,

VOL. LXII, NO. 131

Full Associated Press Service



ABANDONED BABY AT GRADY-While police searched for his mother, the youngster in the arms of Mrs. J. G. Barrow, senior codet nurse at Grady Hospital, Monday seemed to be enjoying his temporary home. The baby was found in a downdrown hotel room Sunday, opporently abondaned. A woman, presumed to be the mother, registered under the name of Mrs. Richard Parker, Solt Loke. City, Ulrah, and disoppeared a few hours lotter, leaving the boby's clothing in an overnight beg and a note giving feeding hours. Police took the child to Grady.—Journal Photo by Trocy O'Neal.

325 New Firms Plan

To Move to Atlanta

Chemical, Building and Auto Industries
Look to Postwar Plants Here, Shaw Says

By JOHN MEBANE, Journal Business Ecitor
A total of 325 firms are actively considering expanding fheir operations so as to move into the Atlanta area or establishing brand-new industries in this area, it was learned Monday from Frank K. Shaw, secretary of the Industrial Burcau of the Atlanta Chamber of Commerce.

Two of these prospects may be able to begin new construction during the year with certificates. When the castern flant is a designed to the construction of the difference of the castern flant is a distinguished to the castern flant in the castern flant of the almost power and the Atlanta chamber of Commerce.

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Bureau of the Atlanta Chamber of Comments of the Property of t

Halke and the remainder are planting to the postwar period.

Mr. Shaw reparted to differs and differs and differs and differs to the can expect from now on to the can expect from now on

Bradley Se Attack on

Americans Turn About To Open Giant Squeeze

By WES GALLAGHEE

SUPREME HEADQUARTERS ALLIED EXPEDITION-ARY FORCE, July 3.—(P)—The American First Army struck south along a 40-mile front on Cherbourg Peninsula Monday, smashing forward up to 21/2 miles in the opening hours of a savage attack.

Supreme Headquarters said doughboy offensive opened at dawn Sunday morning, along the front stretching across Cherbox og Peninsula from St. Lo D'Ourville

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SIENA ON ROAD

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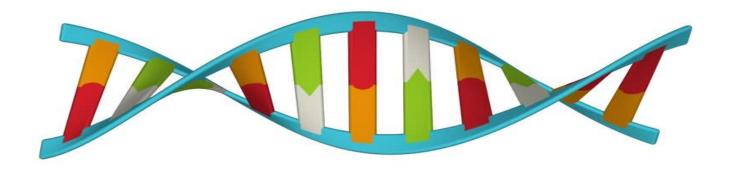
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Putting Squeeze on Germans

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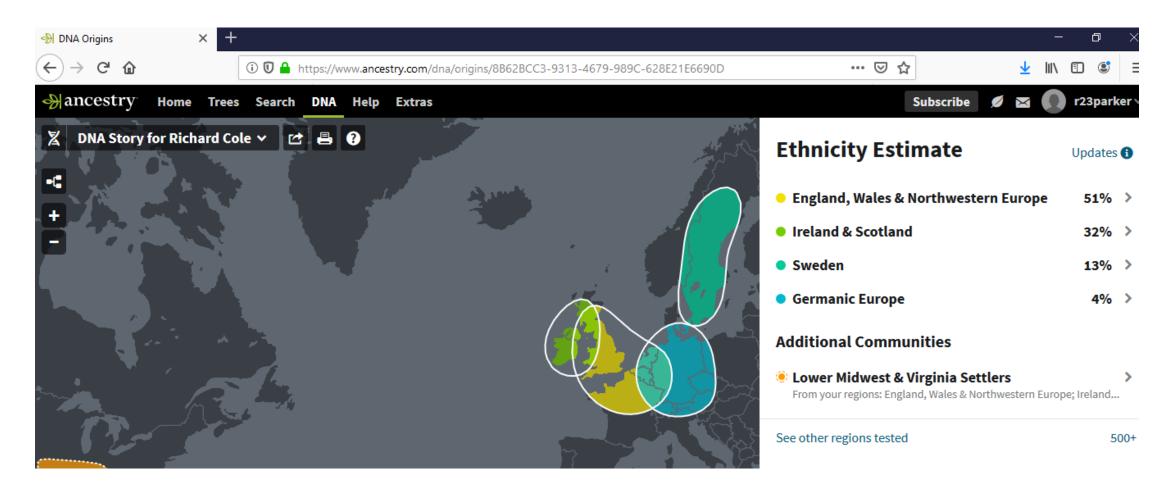


"The secrets of your heritage are encoded in your DNA. DNA testing is the cypher."

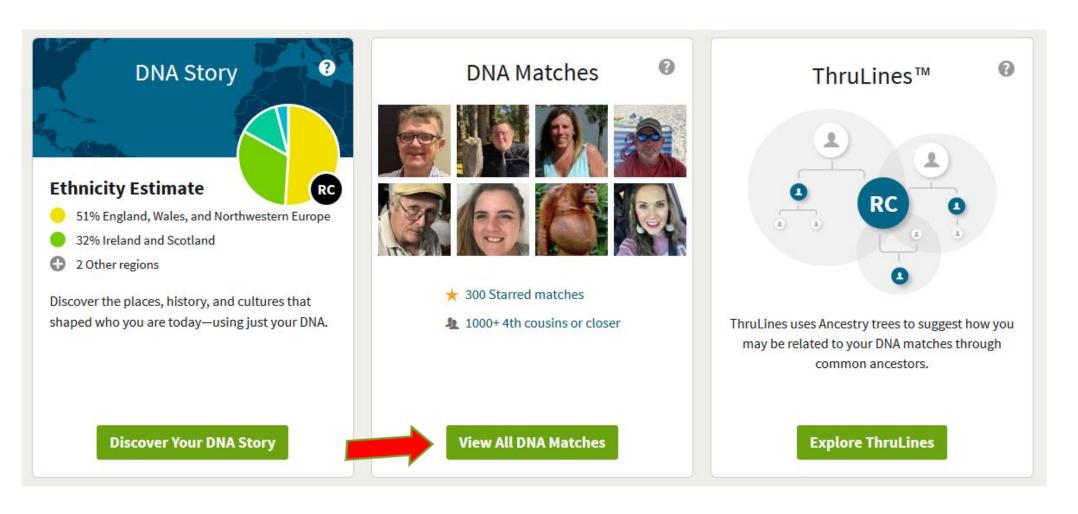
My DNA Testing Strategy

- AncestryDNA first (20M+ members / genealogy)
- Download DNA raw data and upload to:
 - FamilyTreeDNA
 - MyHeritage
 - Gedmatch
- Test with 23andMe (Health reports)

My DNA Results Are In... Now What?



Autosomal DNA Test Results

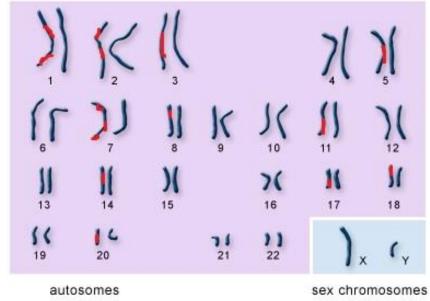


AncestryDNA

1st-2nd Cousin Shared DNA: 481 cM across 24 segments ①	¾ª No Trees	Add to group
2nd-3rd Cousin Shared DNA: 286 cM across 15 segments ①	💐 Unlinked Tree	Add to group
2nd-3rd Cousin Shared DNA: 202 cM across 14 segments (1)	≈. 341 People Ø Common ancestor	Add to group
3rd-4th Cousin Shared DNA: 195 cM across 8 segments	¾ No Trees	★ ⊕ Add to group
3rd-4th Cousin Shared DNA: 189 cM across 11 segments ①	•€ 18 People	★ ⑤ Add to group
3rd-4th Cousin Shared DNA: 171 cM across 10 segments (1)	₹ Unlinked Tree	★ ⑤ Add to group
3rd-4th Cousin Shared DNA: 165 cM across 10 segments (1)	•(a 1,040 People	Add to group
3rd-4th Cousin Shared DNA: 162 cM across 8 segments	₹ Unlinked Tree	Add to group
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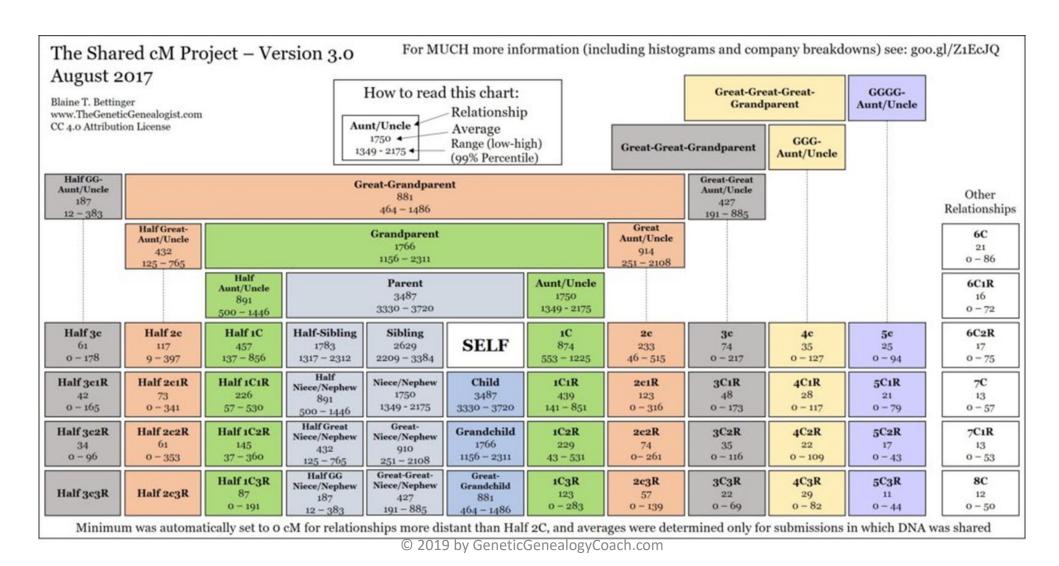
Shared cMs and Segments

- What does "300 cMs across 15 segments" mean?
- DNA companies run algorithms that deposit your matches into relationship categories based on how much DNA you share in common



U.S. National Library of Medicine

Shared cMs Project

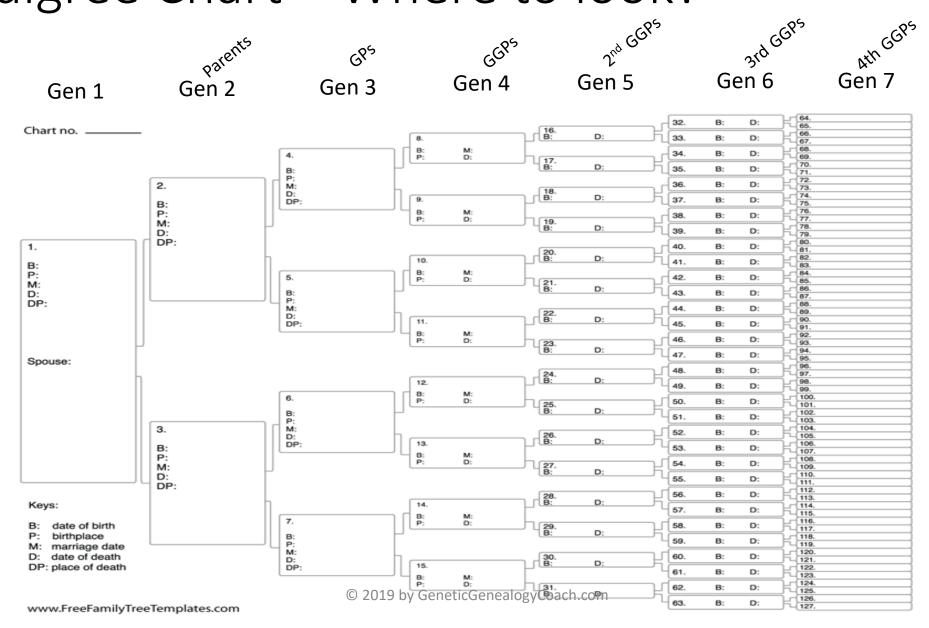


Gerri's C/G Chart Method for Where to look for MRCAs

Share a common set of....

Cousins (C)	Grandparents (G)	
5 th	4 th	
4 th	3 rd	
3 rd	2 nd	
2 nd	1 st (or GGs)	
1 st	Grandparents	

Pedigree Chart – Where to look?





Phasing Your Matches

- Separating your matches into groups by family line
- Phasing maternal and paternal matches may not be possible initially, if both biological parents are unknown
- Use Non-ID and ethnicity to phase matches
- If at least one parent is known, have that parent test (or a close relative on their side of your family) and STAR (or group) all of that person's shared matches.
- Work with remaining matches and their trees

Non-Identifying Information (Non-ID)

- What is Non-ID?
 - Almost all states allow adoptees to request Non-ID
 - Gathered by Social Worker via interview at the time of the pregnancy
 - In some cases the birth mother and/or agency deliberately falsified the information
 - Requests can take weeks, months or years to process

Non-ID can become Identifying

Birth mom

• 5'4, with blonde hair and blue eyes. She was 24 yrs old at the time of adoptee's birth. She loved music and played the flute. She was of Catholic faith and had a Catholic school education. Both of her parents were born in upstate New York. She had one older sister and one younger brother who was diagnosed with epilepsy. Her father passed away from a heart attack the year before adoptee was born. Her mother was a sales associate at a local department store. Birth mom was unmarried and stayed with her maternal grandmother during the pregnancy. Maternal grandfather died of a heart attack in 1928.

Natural father

• 5'10, 160 lbs with brown hair and blue eyes. He had a HS level education, played HS Varsity Baseball and went into the Air Force after graduation. He was of the Baptist faith and was born and raised in Georgia. He was 33 yrs old at the time of the adoptee's birth. Birth mother told him she was pregnant and he did not want to marry her or participate in raising the baby; he was deployed abroad and they did not keep in contact.

Non-Adoptees

Name, location, military service or profession, etc.

Triangulation

What is TRIANGULATION? Shared matches have You overlapping DNA segments Shared matches do not necessarily infer triangulation 2nd Cousins 2nd Cousins **Shared Best** Match Match "A" "B"

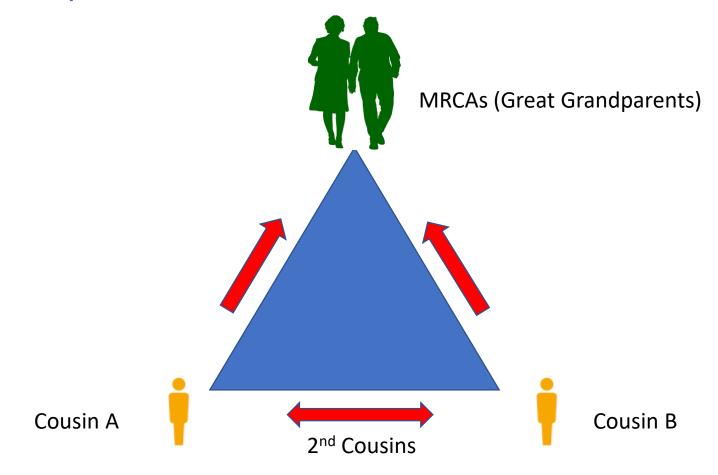
Triangulating Your Matches

Tree Triangulation

- Segment Triangulation
 - Requires access to segment data, often used in conjuction with segment mapping.

Who do they share in common?

Jack Humperdink & Jill Schafer



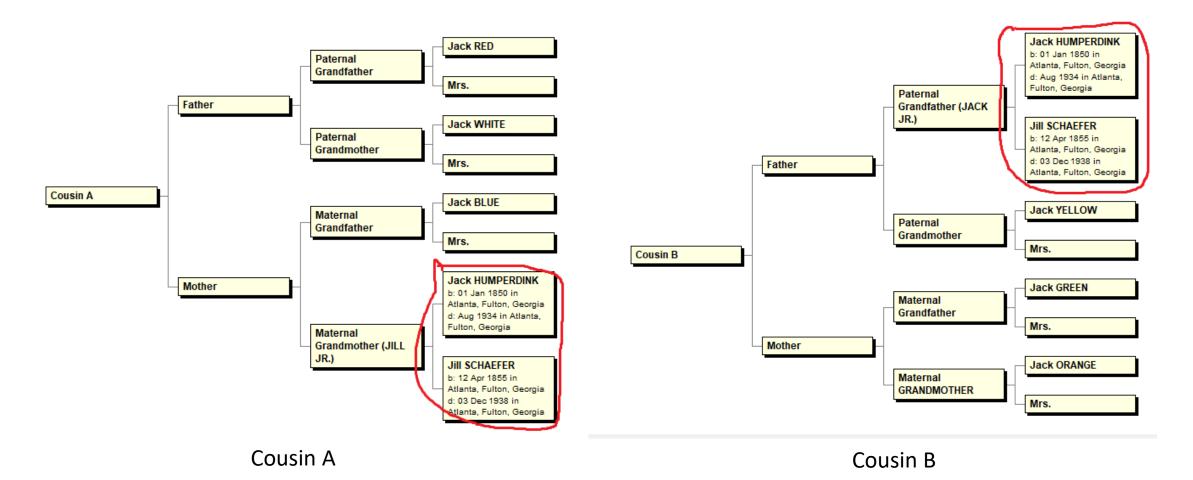
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Triangulation and MRCAs

- The MRCAs (most recent common ancestors) of your genetic cousins is most likely shared by you (or the person of unknown parentage)
- Cousin B is acting as a pedigree chart surrogate
 - We don't know where the adoptee matches Cousin
 A so where another cousin of the adoptee
 matches Cousin A could be the ancestor(s) that the
 adoptee, Cousin A and Cousin B will share in
 common.
- Caveats (proximity of your matches to you and their proximity to each other)



Pedigree Chart Comparison – 2nd Cousins

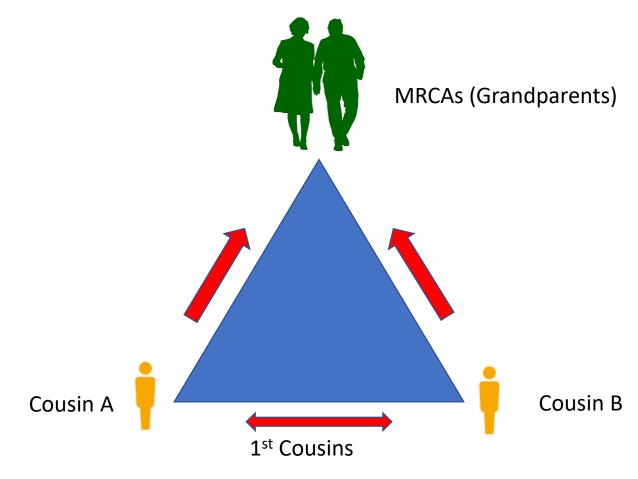


Assumptions – Be careful NOT to make them

- Trees can be inaccurate (misattributed parentage)
- Trees can be incomplete (and often are but tree owner's believe they're accurate)
- Missing people in trees
 - No documentation available
 - You'd literally NEVER find info on them

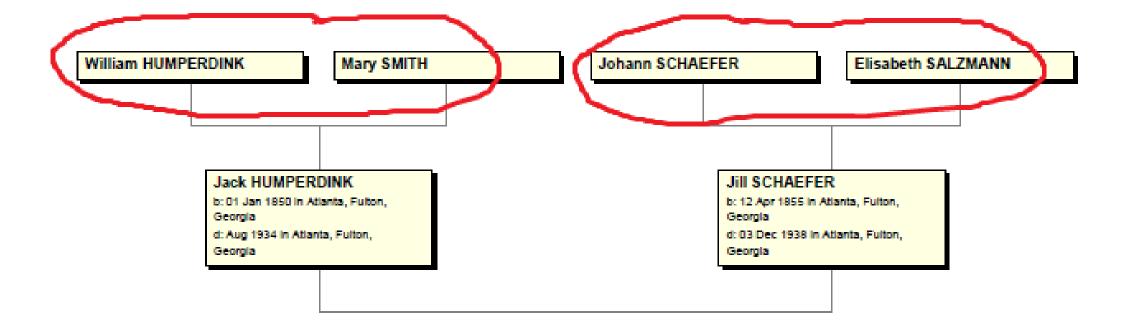
What if they're 1st Cousins?

Jack Humperdink & Jill Schafer

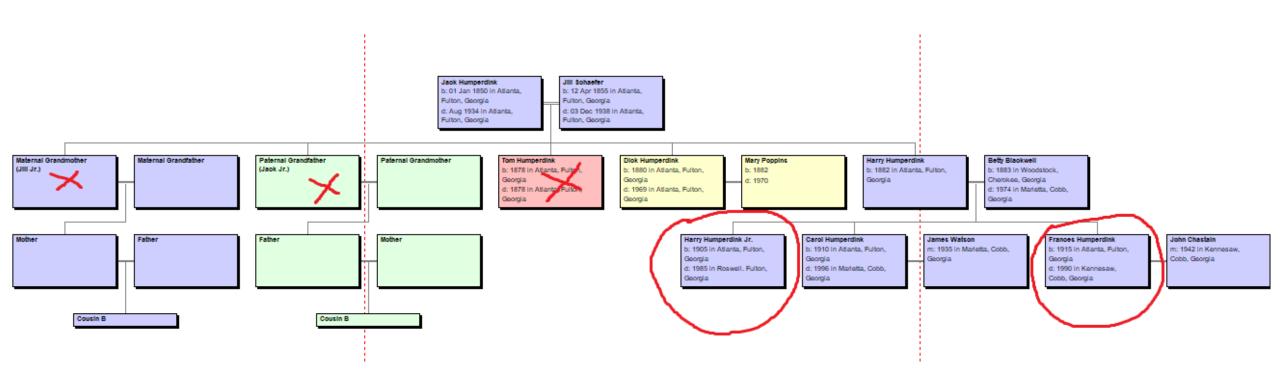


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Must look one generation back...

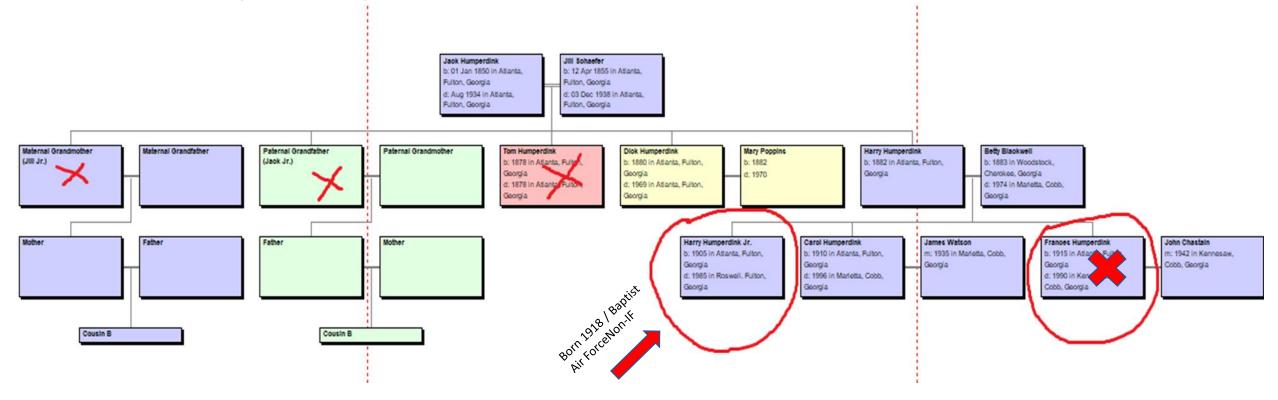


Next Steps: Descendants of Jack & Jill Humperdink



DNA + Trees + Non-ID

- If you use the DNA evidence, in conjunction with Non-ID, sometimes it's possible to solve the case
- You may identify the bio mother or father via circumstantial evidence



DNA Relatives

- Often know facts about their 2nd cousins and closer
- 99% of them will have no idea regarding the identity of the birth parent(s)
- Ensure their tree is complete (don't make assumptions)
- Look for additional marriages
- Look for name changes



Contingencies in DNA Search

- Proximity of your DNA matches/relatives
- Availability of their family trees
- Willingness of your matches to communicate and share tree info
- Availability of information/records
- The only way to be 100% certain of parentage is to ask that parent or their children to test (if possible)

AncestryDNA (Confirmation tests) Richard's two paternal half-sisters and one maternal half-sister

Close Family			
Nina	Close Family–1st Cousin Shared DNA: 1,830 cM across 52 segments 1	No Trees	♠ Add to group
Pamela	Close Family–1st Cousin Shared DNA: 1,816 cM across 53 segments (1)	■ 38 People Common ancestor	★ ⊕ Add to group
Suzanne	Close Family–1st Cousin Shared DNA: 1,803 cM across 56 segments ①	No Trees	★ 🕒 Add to group

Richard and his 3 paternal half-sisters together for the first time.



Brick Walls - A Case Study

You got chocolate in my peanut butter!! Woo Hoo!!

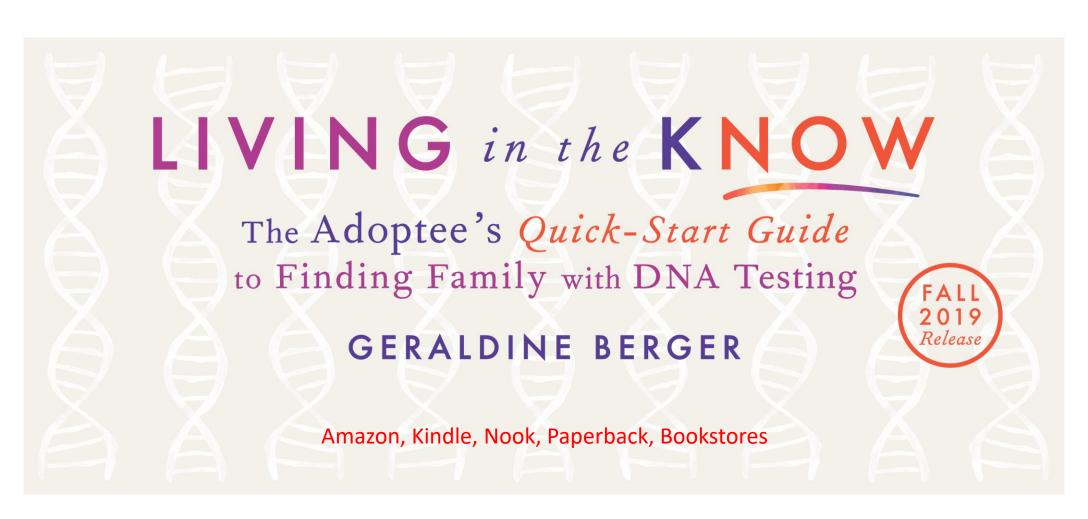


CCGS Members: Please check my BLOG next week for the story I had hoped to tell you.

DNA... Talk about it!

- Questions can loom for days/weeks/years... and then a new match appears!
- Talk about DNA
- Encourage others to test
 - Gift kits
- More testers = More Brick Wall Breakthroughs!
- Link your trees to your DNA test results and don't lock 'em!
 (Only tree owners can see info on living people)

Book Release – Fall 2019



Genetic Genealogy in Action

- Visit my website: <u>www.geneticgenealogycoach.com</u>
- Click "Services" from the main menu
- Click "Cobb County Genealogical Society" in the drop-down menu
- Click PDF icon