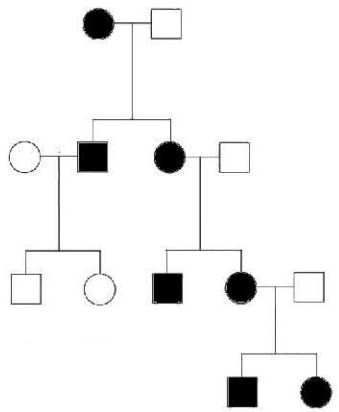
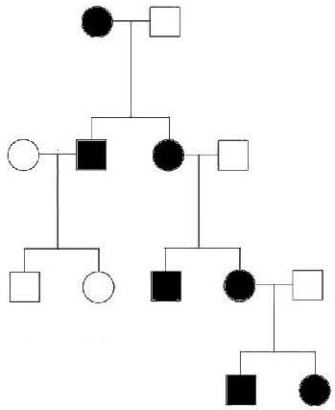
autosomal Dominant



AA
Aa
aa

A?

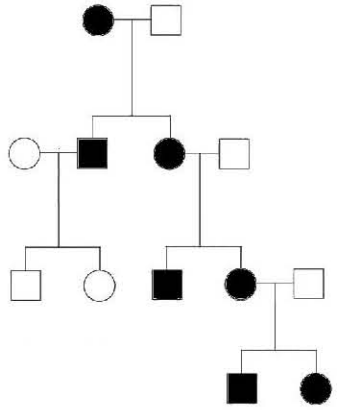
autosomal recessive



AA
Aa
aa

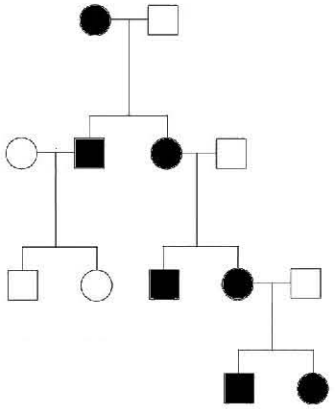
A?

X-linked Dominant



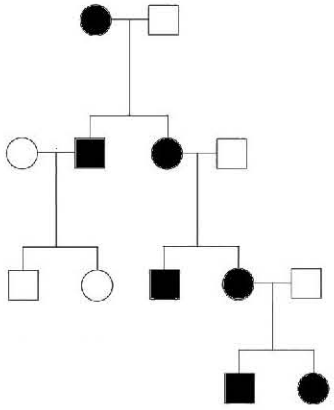
AA
Aa
aa
A-
a-
A?

X-linked recessive

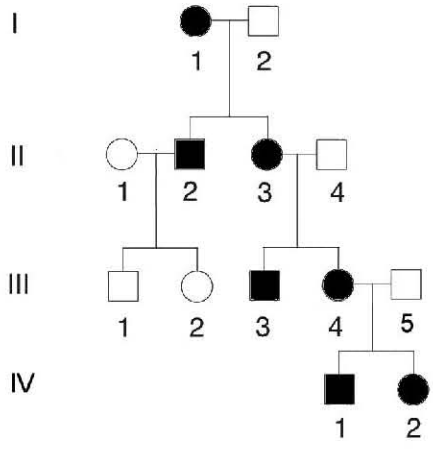


AA
Aa
aa
A-
a-
A?

mtDNA-linked



O

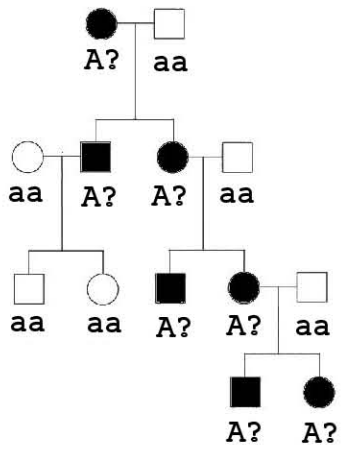


"I've got it,
my mother and her brother both had it,
my nan and *her* brother both had it,
and her mother before that had it."

Q: Given the pedigree at left,
which of the six modes
of inheritance is/are possible?

Assign genotypes to all individuals
based on observed phenotypes.
Some will be ambiguous
Modify genotypes based on genetic rules
& first round of assignments
Identify any parent/offspring combinations
that rule out certain modes

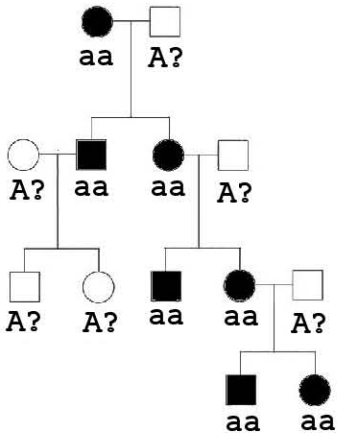
autosomal Dominant



AA
Aa
aa

A?

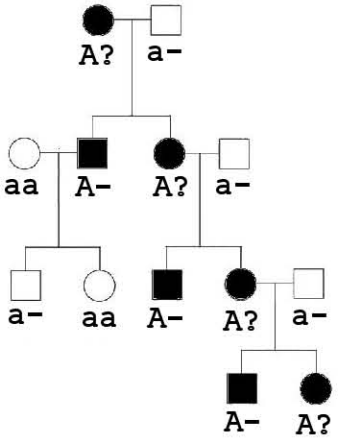
autosomal recessive



AA
Aa
aa

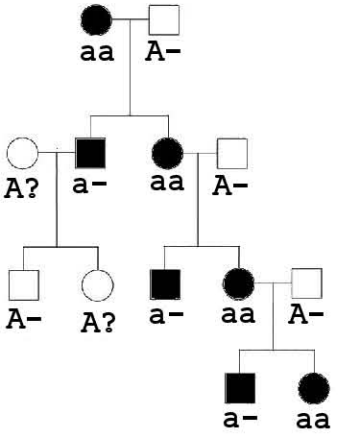
A?

X-linked Dominant



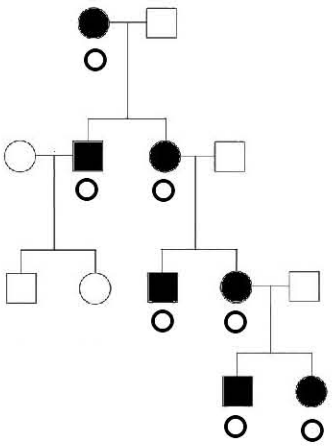
AA
Aa
aa
A-
a-
A?

X-linked recessive



AA
Aa
aa
A-
a-
A?

mtDNA-linked

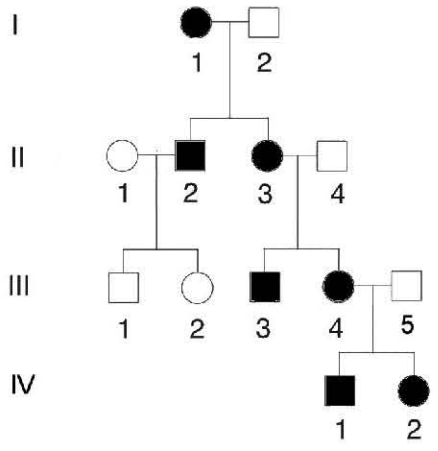


Genotype assignments
for given mode of inheritance
based on observed phenotypes

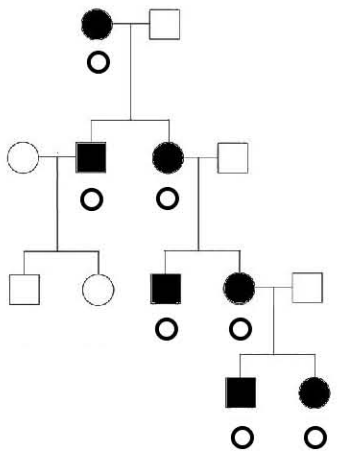
Note that some assignments are ambiguous

All offspring of I-1 have it,
All offspring of affected daughter in II have it
and affected son doesn't pass it on
All offspring of affected daughter in III have it

That is, females always pass it on,
males never do

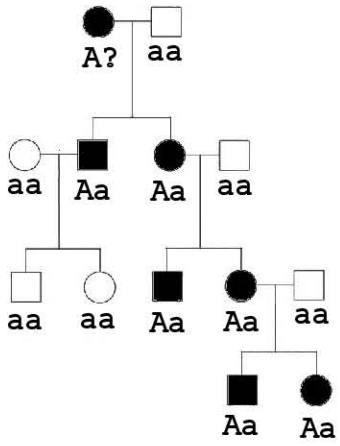


mtDNA-linked



"I've got it,
my mother and her brother both had it,
my nan and *her* brother both had it,
and her mother before that had it."

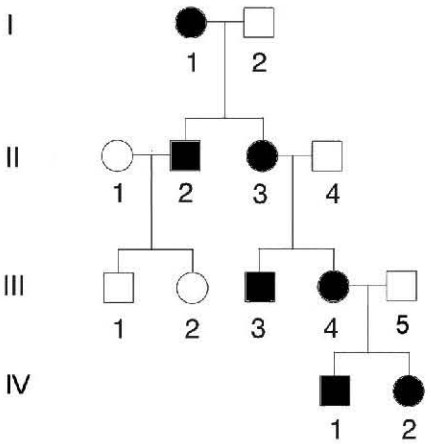
autosomal Dominant



AA
Aa
aa

A?

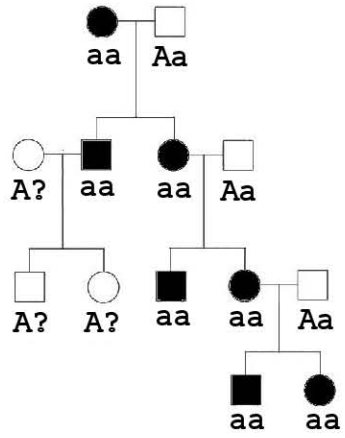
for a *rare* condition,
I-1 is probably Aa but could be AA
Note that all marriage partners are aa
[I-2, II-1, II-4, III-5]
as expected for most people
III-3 & III-4 both get it from dad
[this happens in 1/4 of two-child families]
Same reasoning in IV



"I've got it,
my mother and her brother both had it,
my nan and *her* brother both had it,
and her mother before that had it."

aD
ar
XD
Xr
Y
Mt

autosomal recessive

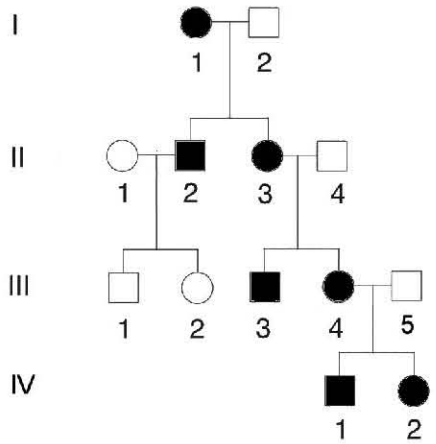


AA
Aa
aa

A?

All affected persons are aa.
for a rare condition,
outside marriage partners are
probably AA
but *could* be Aa
Birth of aa individual to aa parent
requires the other parent to be Aa.
Autosomal recessive inheritance is possible,
but requires series of unlikely genotypes

Counsellors: explore genealogy
of I-2, II-4, III-5



"I've got it,
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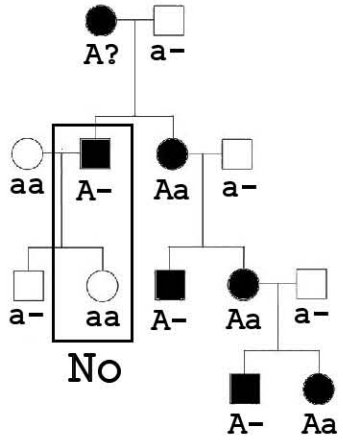
and her mother before that had it."

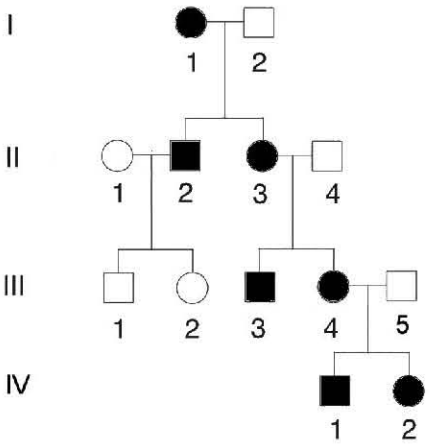
aD
ar
XD
Xr
Y
Mt

X-linked Dominant



AA
Aa
aa
A-
a-
A?

I-1 is likely Aa, could be AA.
All outside marriage partners
are aa or a-
as expected for rare condition
Affected II-2 father unaffected III-2:
all daughters of affected fathers *must* inherit A
X-linked dominant inheritance RULED OUT



"I've got it,
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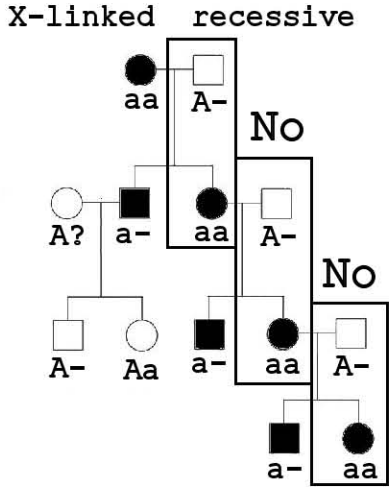
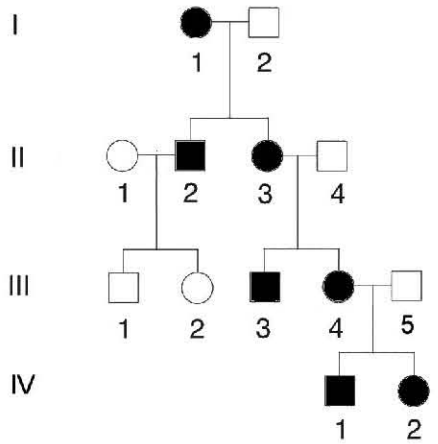
my nan and *her* brother had it,
and her mother before that had it."

aD
ar
XD
Xr
Y
Mt

Unaffected fathers cannot have affected daughters:
X-linked recessive inheritance
ruled out by inspection.





"I've got it,
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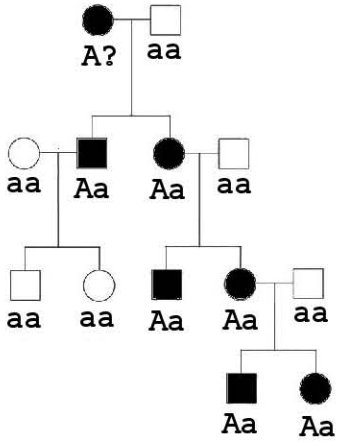
and her mother before that had it."

aD
ar
XD
Xr
Y
Mt

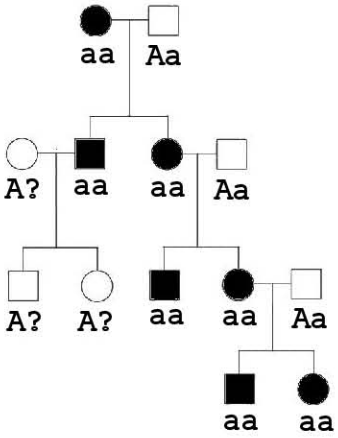
autosomal Dominant



AA
Aa
aa

A?

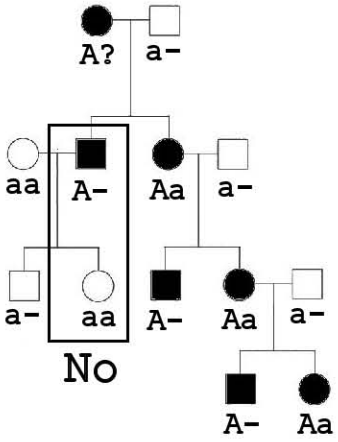
autosomal recessive



AA
Aa
aa

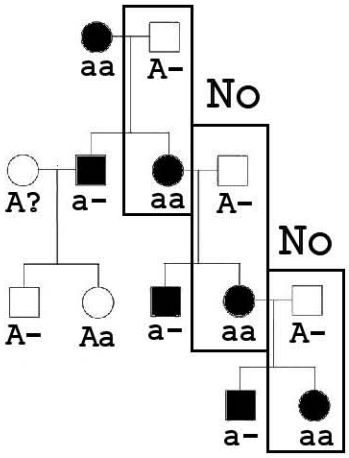
A?

X-linked Dominant



AA
Aa
aa
A-
a-
A?

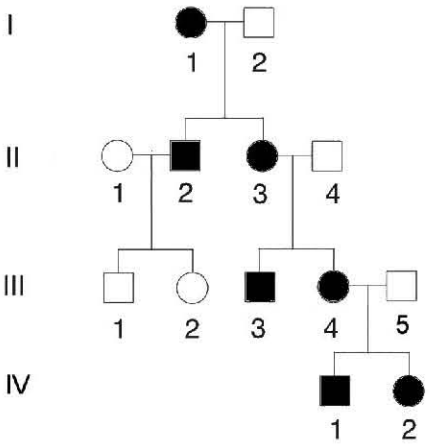
X-linked recessive



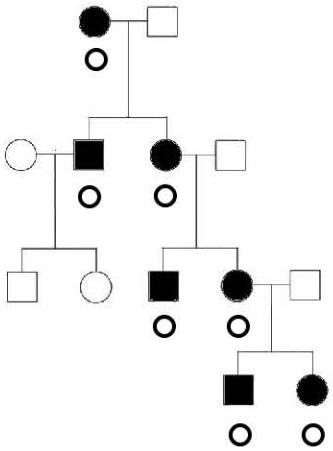
AA
Aa
aa
A-
a-
A?

All daughters of affected fathers must be affected

All daughters of unaffected fathers must be unaffected



mtDNA-linked



"I've got it,
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and her mother before that had it."

aD ***yes***
ar ***yes*** [unlikely]
XD ***no***
Xr ***no***
Mt ***yes***
Y ***no***