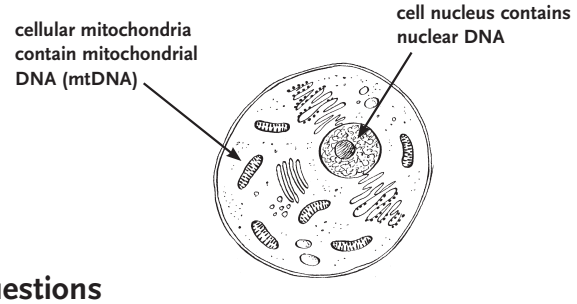
The Hunt for mtDNA

You are a forensic scientist recruited to help solve a long-standing "missing persons" case. Mitochondrial DNA, or mtDNA for short, is the key to your success.



Procedure

1. Read the *Guidelines for mtDNA Inheritance.*
2. Take careful notes as your teacher describes the important elements of the "Case of the Missing Dung Beetle Biologist." Identify which family members in the *Who's Related by mtDNA?* pedigree chart should be chosen to donate their mtDNA for comparison with the missing person's mtDNA (the missing person is noted by a question mark). All deceased individuals have been cremated and cannot be sampled for mtDNA.
3. Connect individuals who share mtDNA from the great-great grandmother by darkening the lines that link them to one another.
4. Of the individuals connected by dark lines, circle the living relatives who are eligible to be tested for mtDNA.

Questions

Write your answers on a separate sheet of paper.

1. How many living relatives could provide mtDNA to test against the mtDNA of the discovered remains that are believed to belong to the missing person shown by a question mark in the pedigree chart?
2. Describe the inheritance pattern of mtDNA.
3. If two brothers died in a crash, could you use mtDNA to distinguish their remains one from the other? Why or why not?
4. How far back could you trace a lineage of mtDNA?

Guidelines for mtDNA Inheritance

Mitochondrial DNA (mtDNA) is found in each cell's mitochondria, structures that produce ATP, the cell's main energy source. Here are some guidelines about how mtDNA is inherited:

- mtDNA can only be inherited from a woman.
- A man can inherit mtDNA from a woman.
- A man cannot pass mtDNA on to any children.

Who's Related by mtDNA?