Your Genes and You: Perspectives on Huntington’s Disease from a Genetic Counselor

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History of HD gene testing

- 1983 – Marker linked to HD gene identified
- 1986 – Linkage analysis available in some families
- 1993 – HD gene and CAG repeat as mechanism for HD identified
Impact of Test Availability

- Did everyone rush into a genetics clinic to be tested?
  - No

- Why not?
  - It’s complicated…

Predictive vs. Diagnostic Testing

- Predictive testing
  - Person with NO symptoms of HD
  - Person at-risk for HD based on family history
  - Also referred to as pre-symptomatic testing

- Diagnostic testing
  - Person with symptoms of HD
  - Used to confirm a diagnosis (possible impact on management)
  - Molecular confirmation to allow family members to be tested with more certainty
Predictive Testing Process

- Psychological Evaluation
- Neurological Evaluation
- Initial Genetic Counseling
- Blood draw
- Results visit

Psychological Evaluation
- Meet with psychologist and/or social worker for a mental health assessment
- Goal is to determine state of mind and identify any stressors or factors that would affect decision-making
- Help identify those who may need greater emotional support during and after testing
Predictive Testing Process

- Neurological Evaluation
  - HDSA guidelines state that a neurological evaluation should be offered to any applicant who is concerned about or suspicious of HD symptoms
  - If someone is having symptoms of HD, it may provide needed information and render genetic testing unnecessary
  - In some cases, it may alleviate concern about symptoms that are not related to HD

- Initial Genetic Counseling
  - Collect detailed personal and family history information
  - Review some basic genetics
  - Discuss the inheritance of HD
  - Discuss the testing options
  - Try to address patient specific concerns
  - Explore motivations, preconceptions, expectations, support system, coping strategies, etc.
Genes

Cell
Nucleus
Chromosomes
Gene
Protein

Protein Formation

Which proteins a cell makes is determined by genes that are organized in series of 3 base pairs, called "codons"

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GCCTAGTTACTGCGCGGATCAATGACG
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codon

Every codon codes a specific amino acid in a specific order

Amino acid

Protein
The sequence of letters in the genetic code (A, T, G, and C) directs the formation of a protein:

- Each set of 3 letters corresponds to an amino acid.
- Amino acids are the basic building blocks of proteins.

Just as English words represent certain images, DNA “words” (codons) represent certain amino acids.

CAG Repeats

Genetic test results correspond to the ranges of the CAG repeat site.
## CAG Trinucleotide Repeat

<table>
<thead>
<tr>
<th>Results</th>
<th>Repeat #</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>&lt; 26</td>
</tr>
<tr>
<td>Normal but potentially unstable</td>
<td>27-35</td>
</tr>
<tr>
<td>Abnormal with variable penetrance</td>
<td>36-39</td>
</tr>
<tr>
<td>HD</td>
<td>&gt; 40</td>
</tr>
</tbody>
</table>
Predictive Testing Process

- **Blood Test**
  - One tube of blood
  - ~$256 (but prices vary tremendously)
  - May choose to pay for test or go through insurance
  - 3-4 weeks turn around time
  - Results indicate the number of CAG repeats

- **Results visit**
  - Results are disclosed in person
  - Must bring a support person

Predictive Testing

- Genetic testing does not tell us when some will develop symptoms or which symptoms they will have
- The decision of whether or not to have predictive testing for HD is a very complex and personal one
- There are no right or wrong choices
- Everyone must make their decision based on their own experiences and beliefs
- It is important that those seeking this testing receive adequate support, education and assessment of readiness for this information
Insurance Concerns

- State and federal laws that protect us from genetic discrimination
  - Several KY laws
  - HIPAA
  - GINA - Genetic Information Nondiscrimination Act passed in 2007 and states that an employer or health insurance company cannot treat you differently based on a genetic test result
- Not as many protections with respect to life and/or disability insurance

Things to Think About

- What would I do differently if the test were positive?
- What would I do differently if the test were negative?
Things to Think About

- Motivations
  - Knowledge
  - Financial planning
  - Family planning
- Relationships and support
- Perceptions or exposure
- Family influences
- Financial concerns
- Timing

The Big Cloud

- Some at-risk individuals become consumed with thinking about whether or not to undergo testing
- May be useful to make a decision about timing
  - Ex: I am not going to be tested this year.
  - Ex: I am not going to think about it until...
Make a Plan

- Need to have a pre-arranged plan
  - Do you tell people you are getting it done?
  - Who?
  - When and how to tell?
  - Do you tell them what day you will get the results?
  - Time off of work

Coping with the Results

- Studies have shown that both carriers and non-carriers have challenges coping with, and adjusting to, their new knowledge of their genetic status
- Issues facing carriers
- Issues facing non-carriers
Coping with the Results

  - Studied distress in 24 carriers and 33 non-carriers
  - Five years after the test, mean distress scores of both carriers and non-carriers were within the normal range. Carriers did not differ from non-carriers with regard to mean general distress.

  - Review article that compiled data from 8 studies on psychological impact of predictive HD testing
  - No significant difference in distress between groups at 5 or 10 year follow-up

Take Home Message...

- To Test or Not to Test
  - Complex and personal decision
  - Many factors to consider (timing, motivations, support network, etc.)
  - See a genetic counselor if you want to learn more

- If you test, please have it done through a center that understands the delicate nature of the test and respects confidentiality
Questions?