Chapter highlights: Degenerative Disorders (Ch 12)

The purpose of “chapter highlights” is to offer a framework in which to think about the specific information discussed in each Brain Facts chapter. These highlights draw upon information in the chapter and on the new Brain Facts web site (http://www.brainfacts.org) and occasionally, on our own knowledge of neuroscience that may not be discussed in Brain Facts. Questions for Brain Bee will come from Brain Facts (new 2012 publication) and entries from the new Brain Facts web site that have “brainfacts.org” in the URL. Some but not all relevant entries are cited below.

Neurodegenerative diseases: General framing

- associated with neuronal death (i.e., neurodegeneration)
- often associated with impaired motor and/or cognitive function
- often emerge in mid to late life (50 – 70)
- research from animal models of disease suggest that cell dysfunction underlies early stages of disease associated with moderate symptoms and that cell death probably underlies the continued and progressive worsening of disease symptoms as the patient ages
  - hence, it imperative that practitioners of science and medicine develop better ways of diagnosing disease early on, before the neurons have died, so that the disease can be reversed by restoring cell function. In short, once neurons have died, they cannot be saved.
- the cause(s) of neurodegenerative diseases is often unknown
- age is often the greatest risk factor for developing a brain disease
- mutant genes have been linked to particular neurodegenerative diseases, but these linkages account for only a minority of cases/diseases
  - mutant proteins tend to be expressed broadly throughout the body, including the brain and spinal cord, but only affect select cell populations (a conundrum!)
  - gene mutations can cause disease through a loss of function (by disrupting the normal function of a protein essential to cell health and viability) or through a gain of (new) function that is toxic to cells
- accumulation of misfolded proteins is thought to be a common causative factor underlying many brain diseases including Parkinson’s, Alzheimer’s, Huntington’s and ALS.


Discussion of each disease (Alzheimer’s, ALS, Huntington’s and Parkinson’s) in Brain Facts follows the same organization:

- Symptoms
- Diagnostic approaches and tools
- Associated brain pathology
- Any known gene mutations
- Research and treatments

Check out the Brain Facts web site:
Alzheimer’s disease


Amyotrophic Lateral Sclerosis


Huntington’s disease


Parkinson’s disease


Shows the benefits of deep brain stimulation for reversing movement disorders in a patient who probably has Parkinson’s:


Also...don’t forget to check out relevant videos on our Brain Bee web site!