

Cannabis and Health

Module 12: Neurocognitive/Brain Disorders Part II

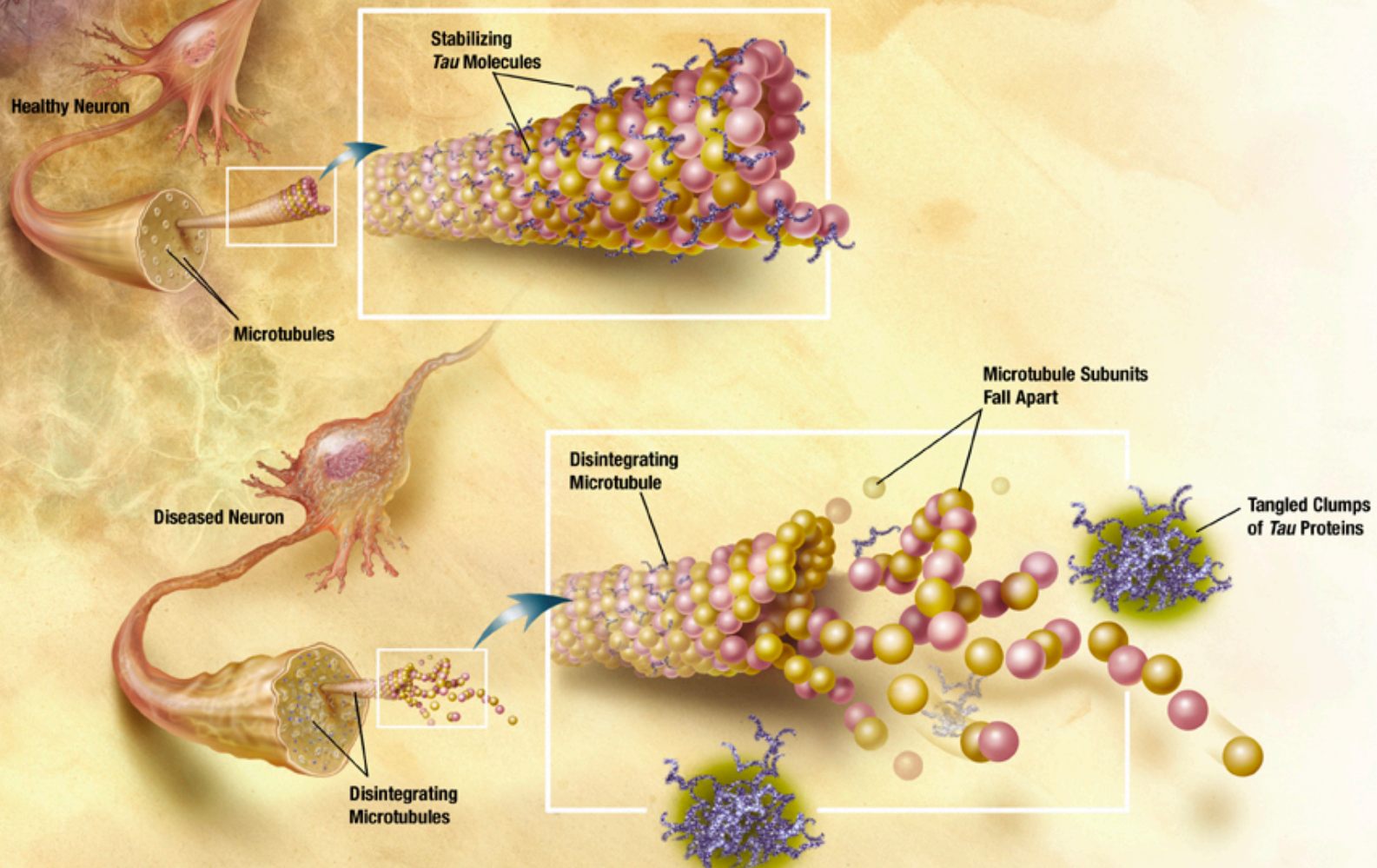
Lecture 1: Parkinson's Disease and Alzheimer's
Disease

Neurocognitive and Brain Disorders

- Neurodegenerative diseases are marked by the progressive loss of structure or functions of neurons
 - Parkinson's Disease
 - Alzheimer's Disease (and other dementia)
 - Huntington's Disease
 - Amyotrophic Lateral Sclerosis (ALS; Lou Gehrig's Disease)
- These diseases are currently incurable, resulting in progressive degeneration
- This class of diseases share some commonalities
 - Atypical protein formations
 - Induced cell death

Alzheimer's Disease

- Alzheimer's disease (AD) is an age-related, non-reversible brain disorder that develops over a period of years
 - Accounts for 60-70% of dementia
 - Most common early symptom is difficulty in remembering recent events
 - Later symptoms include problems with language, disorientation (getting lost), mood swings, amotivation, poor self care, and behavioral issues
 - Gradually, bodily functions are lost, leading to death
- Typical life expectancy following diagnosis is three to nine years



Alzheimer's Disease

- Three major hallmarks in the brain associated AD.
 - **Amyloid plaques:** comprised of fragments of a protein called beta-amyloid peptide (mixed with other proteins, remnants of neurons, and bits and pieces of other nerve cells)
 - **Neurofibrillary tangles (NFTs):** found inside neurons, are abnormal collections of a protein called tau
 - Normal tau is required for healthy neurons
 - In AD, tau clumps together and neurons fail to function normally
 - **Loss of connections between neurons responsible for memory and learning.**
 - Neurons can't survive when they lose connections to other neurons
 - As neurons die, regions atrophy or shrink (larger ventricles)

Alzheimer's Disease

- Rarely, people develop AD in their 30s, 40s, and 50s (early-onset)
 - Three inherited genes have been identified causal
- 90% of AD develops after age 65 (late-onset)
 - Probably due to a combination of genes, environment, and lifestyle
- The development and pattern of damage in the brain is in different in early vs. late onset

Alzheimer's Disease

- **Pre-dementia (symptoms misattributed to aging/stress)**
 - Mild cognitive difficulties can begin 8 years prior to diagnosis.
 - Subtle deficits in attention, planning, abstract thinking, memory
 - Depressive symptoms or irritability is common
- **Early (increasing impairment, definitive diagnosis)**
 - Older memories (facts) and implicit memory (how to do things) not yet affected
- **Moderate**
 - Progressive deterioration makes it difficult to be independent
 - Speech difficulties like declining vocabulary
 - Become less coordinated with increased risk of falling
 - Long-term memory becomes impaired
- **Advanced**
 - Completely dependent on others for care

Alzheimer's Disease

- Diagnosis
 - Usually based on the person's medical history, history from relatives, and behavioral observations
 - Medical imaging can exclude other pathology or dementia.
- Criteria were established in 1984
 - Presence of cognitive impairment can provide possible or probable diagnosis
 - A definitive diagnosis requires examination of brain tissue

Alzheimer's Disease

- DSM 5 Criteria for Probably/Possible Alzheimer's
- **Probable Diagnosis if either**
 - Evidence of a AD gene (family history or genetic testing).
 - All three of the following are present:
 - Clear evidence of decline in memory/learning.
 - Steadily progressive, gradual decline in cognition, without extended plateaus.
 - No evidence of mixed etiology.
- The disturbance is not better explained by cerebrovascular disease, another neurodegenerative disease, the effects of a drug, or another mental, neurological, or systemic disorder.

Alzheimer's Disease: Agitation and Aggression

- As the disease progresses, patients may demonstrate agitation and aggression
 - Agitation involves restlessness, sleeplessness, pacing, and worry
 - Aggressiveness may involve lashing out verbally or physically (e.g., trying to hit someone)
 - Difficult for caregivers
- Goal is to treat the underlying cause
 - May be related to pain, depression, anxiety lack of sleep – goal is to treat
 - Environmental conditions (e.g., soiled underwear, change in surroundings)
 - Medication interactions

Parkinson's Disease

- Parkinson's disease (PD) is a motor system disorder
 - The four primary symptoms
 - tremor, or trembling in hands, arms, legs, jaw, and face
 - rigidity, or stiffness of the limbs and trunk
 - bradykinesia, or slowness of movement
 - postural instability, or impaired balance and coordination
 - Symptoms may cause difficulty with simple tasks
- Usually affects people over the age of 60
 - Symptoms can begin to interfere with daily activities
 - Depression and other emotional changes can occur
- Currently laboratory tests for diagnosis
 - Diagnosis is based on medical history and examinations

Parkinson's Disease

- PD is both chronic and progressive
 - persists over a long period of time
 - symptoms grow worse over time
- Some become severely disabled, but others experience only minor motor disruptions
 - Tremor is the major symptom for some individuals
- Currently not possible to predict for an individual
 - which symptoms they will have
 - or, the intensity of their symptoms

Parkinson's Disease

- Process diagnosis is similar to Alzheimer's
 - Assessments involve medical history and neurological examination
 - Improvement in response to PK meds further supports diagnosis.
 - Neural markers of PD (Lewy Bodies) on autopsy are a definitive
- Medical organizations have created diagnostic criteria.
 - The UK Queen Square Brain Bank require slowness of movement plus
 - rigidity,
 - resting tremor, OR
 - Postural instability
 - 3+ of the following required during onset
 - unilateral onset,
 - tremor at rest,
 - progression in time,
 - asymmetry of motor symptoms,
 - response to levodopa for at least five years

Conclusions

- Alzheimer's
 - Is a progressively neurodegenerative disease that impacts neurocognitive function
 - As the disease worsens, patients need full-time care
 - Agitation and Aggression commonly related to underlying issues with depression, anxiety, loss of sleep make care difficult
- Parkinson's
 - Is a progressive neurological disorder involving the motor system and dopamine
 - Symptoms include tremor, stiffness, loss of balance