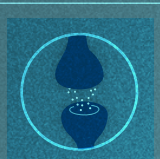
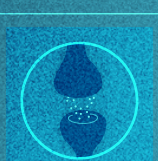
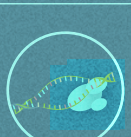
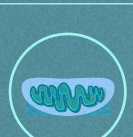
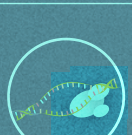
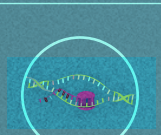
DAY JOBS

Neurodegenerative diseases have long been associated with aggregations of apparently toxic proteins, whether that's amyloid-β—a product of amyloid precursor protein (APP) breakdown—in Alzheimer's disease, α-synuclein in Parkinson's, or huntingtin in Huntington's. But when not mutated, misfolded, or otherwise misbehaving, these proteins seem to play critical roles in brain development and function, leading some researchers to suspect that disruption to those normal functions may play a role in disease. Some of the purported functions of these three proteins, surmised primarily through in vitro and animal studies, are shown below.

	Neural signaling	Intracellular trafficking	Neuronal growth	DNA repair	Gene expression	Other
APP	 Binds to $GABA_B$ receptors on neurons, regulating the release of neurotransmitters such as GABA and glutamate	 Mediates the intracellular trafficking of vesicles and other materials	 Promotes neurogenesis and may help direct neuronal migration during brain development			 Binds to Wnt proteins, influencing cell signaling and neuronal growth
α-Synuclein	 Regulates the release of neurotransmitters and other cargo from dopamine neurons	 Interacts with the membranes of vesicles and other cellular components, helping to regulate intracellular trafficking		 Influences DNA repair pathways	 Influences gene expression by binding to and modulating the stability of messenger RNAs	 Helps regulate mitochondrial and lysosomal homeostasis
Huntingtin	 Promotes the intracellular trafficking of vesicles and other materials	 Regulates neuronal cell division and differentiation	 Influences DNA repair pathways	 Mediates transcription of dozens of genes	 Protects neurons from programmed cell death (apoptosis)