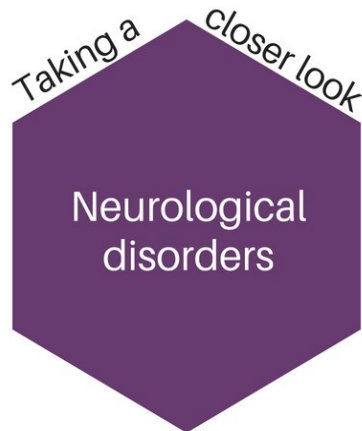
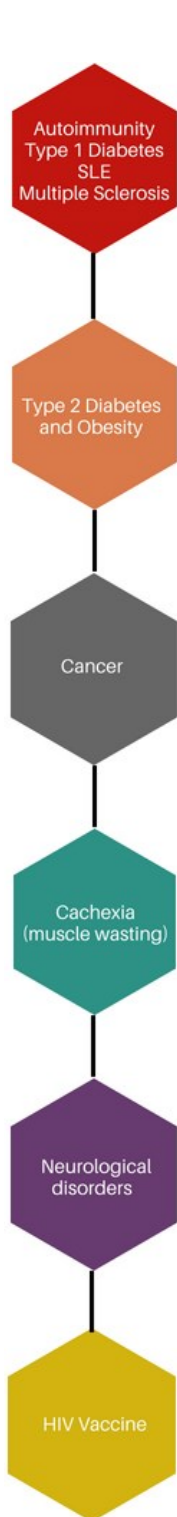


The Bench and Beyond

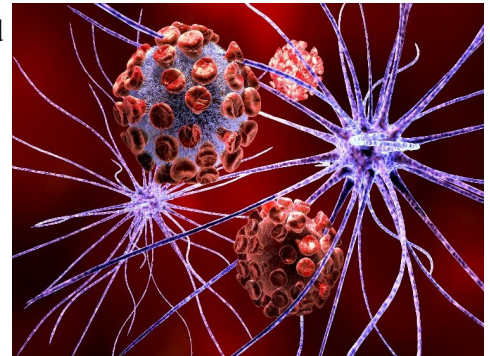


In people who are infected with the Human Immunodeficiency Virus, HIV, the virus can be carried to the brain by hitching a ride in cells that circulate around the body. Once in the brain, the virus moves from cell to cell altering normal cellular function, changing the brain environment, and even causing cell death. Altered cell function and cell death in the brain can cause a collection of disorders known as HIV-associated neurocognitive disorders (HAND). These include a decline in, memory, attention, language, perception, capacity to learn, and dementia.

According to the World Health Organization, in 2016, 53% of people with HIV were treated with antiretroviral (ARV) drugs.

A study published in January 2017 by the National Institute on Aging (U.S. Department of Health & Human Services) reported that more than half of HIV patients have HAND. Although ARV drugs have been instrumental in preventing progression to AIDS, they do not protect from HAND, which is now on the rise as this patient population is aging.

SDBRI scientists working on HAND have discovered a biological process that we believe is involved in accelerating the aging process in people with HIV, increasing their risk of dementia. We are now focused on designing and testing strategies to stop that biological process for the purpose of predicting and preventing the onset of dementia. SDBRI scientist, Dr. Cecilia Marcondes, is currently testing the hypothesis that HIV triggers mechanisms that accelerate the aging process. Ongoing research to examine which genes, proteins and cells are enhanced in the brains of people with HIV-infection shows that the brain of a person with HAND has characteristics of someone 20 years older. This information is important because treatments that are available for age-related dementia might be relevant to patients with HAND.



Nerve cells being attacked by virus

Another factor that can aggravate central nervous system function during HIV infection is drug abuse. A drug of particular concern is methamphetamine, which is cheap, highly addictive, and its use is rapidly increasing. There is substantial overlap between the population at risk of HIV infection and methamphetamine abuse. The Marcondes group has shown that methamphetamine use increases the number of cells that HIV likes to infect in the central nervous system, increasing the size of the HIV reservoir, and aggravating inflammation. Dr. Marcondes' research focuses on how methamphetamine encourages cells in the brain to attract and provide a home for HIV infection. This information will then be used to design therapies to stop HIV from infecting cells in the brain, and to alleviate neurological symptoms in recovering individuals.

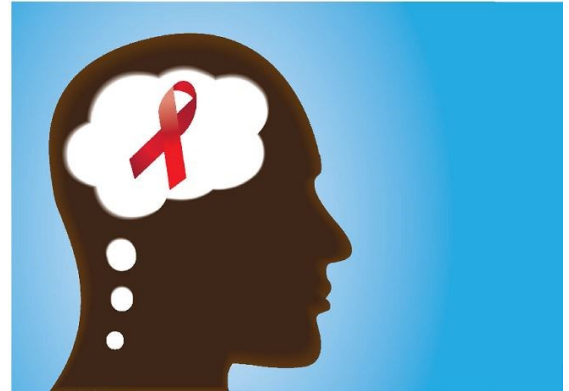
Frequently Asked Questions!

What is the difference between neurocognitive disorders and neurological disorders?

Neurological disorders are disorders that affect the brain, spinal cord and nerves. Neurocognitive disorders are a subset of neurological disorders and include those that affect reasoning including mental, intellectual, perceptive, memory, and attention.

What causes HAND?

When HIV infects the brain it can stay dormant, or quiet. This allows it to hide for a long time. When the virus becomes more active, local inflammation is increased in the brain and damages the brain and the nerve cells. As the cells deteriorate over time, neurological function is gradually lost.



Can people with HIV have a normal life-span?

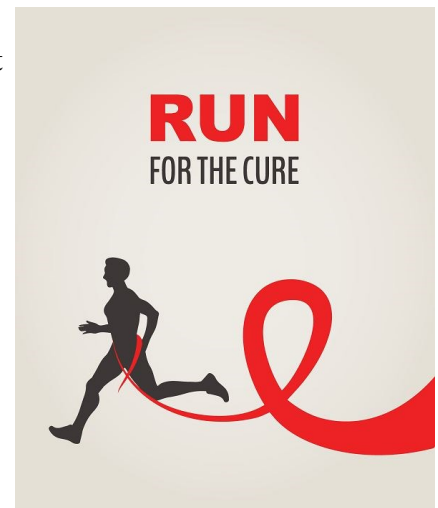
Yes, they can. When HIV was first discovered, HIV infection was lethal. Through a massive and concerted effort by research scientists and physicians, new drugs were developed that turned a sure death sentence into a chronic condition. Today, HIV-infected individuals who follow treatment guidelines can expect to have a normal lifespan.

Is HAND the only complication that HIV patients experience?

No, people with HIV appear to age more quickly than their age group. As a result they are at greater risk of several other conditions that are prevalent in the aging population, including, cardiovascular disease, metabolic conditions, cancer, kidney disease, liver failure and osteoporosis.

Is there an effective treatment for HAND?

The overall strategy to reduce the risk of neurocognitive disorders in people with HIV is to reduce the amount of virus in the body as much as possible. Patients who start treatment early, and adhere carefully to treatment protocols with antiretroviral drugs, are less likely to experience neurocognitive disorders than others. We are hopeful that there is good news on the horizon as there are several new drugs in development for the treatment of HAND, and more in the pipelines as we understand how HIV accelerates mechanisms of aging.



Next Issue:


Type 2 Diabetes
and Obesity

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