U.S. Department of Health & Human Services

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Turning Discovery Into Health

Combining tests more accurately diagnoses prostate cancer
The type of biopsy traditionally used to diagnose prostate cancer takes systematically spaced tissue samples from the prostate gland. This method isn't targeted and can lead to uncertainty about whether a man has aggressive prostate cancer. Researchers found that adding MRI-targeted biopsies to the traditional prostate biopsy created a more accurate diagnosis and prediction of the course of prostate cancer. The approach is poised to help reduce both overtreatment and undertreatment of the disease.

Early detection of Alzheimer's disease
Having a simple blood test to detect Alzheimer's disease before symptoms develop would aid the study of treatments to slow or stop its progression. Studies found that a protein called ptau181, which can be measured in the blood, was as good as invasive or expensive tests at diagnosing Alzheimer's early.

Advances in restoring vision

Several common eye diseases, such as age-related macular degeneration and retinitis pigmentosa, damage the retina, the light-sensitive tissue in the eye. They can eventually lead to vision loss. Two studies looked at ways to restore vision in mouse models. Researchers reprogrammed skin cells into light-sensing eye cells that restored sight in mice. The technique may lead to new approaches for modeling and treating eye diseases. Other scientists restored vision in blind mice by using gene therapy to add a novel light-sensing protein to cells in the retina. The therapy will soon be tested in people.

Blood protein signatures change across lifespan

The bloodstream touches all the tissues of the body. Because of the constant flow of proteins through the body, some blood tests measure specific proteins to help diagnose diseases. Researchers determined that the levels of nearly 400 proteins in the blood can be used to determine people's age and relative health. More research is needed to understand if these protein signatures could help identify people at greater risk of age-related diseases.

Understanding HIV's molecular mechanisms

More than a million people nationwide are living with HIV, the virus that causes AIDS. HIV attacks the immune system by destroying immune cells vital for fighting infection. Researchers uncovered key steps in HIV replication by reconstituting and watching events unfold outside the cell. The system may be useful for future studies of these early stages in the HIV life cycle. In other work, experimental treatments in animal models of HIV led to the viruses emerging from their hiding places

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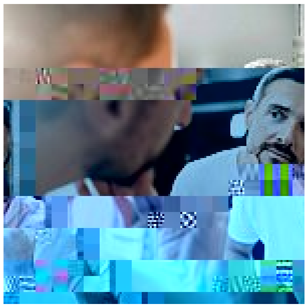
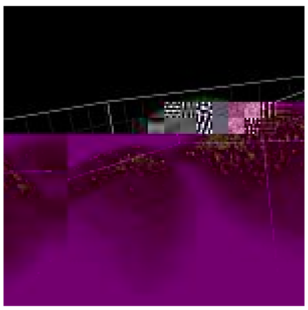


How stress causes gray hair

A study confirmed that stress can turn hair prematurely gray—and discovered how. Scientists found that stress affects the stem cells responsible for regenerating hair pigment. Chemicals involved in the body's fight-or-flight response cause permanent loss of these stem cells so that new hair appears gray or white. The findings give insights for future research into how stress affects stem cells and tissue regeneration.

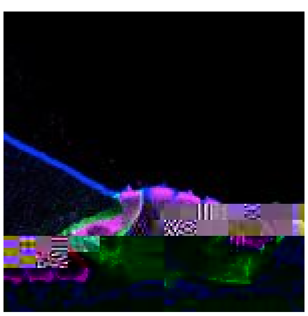


How the nose decodes complex odors

The nose contains millions of specialized neurons that allow it to smell different odors. Simple odors activate a particular combination of neurons that send a coded message to the brain. Researchers used an advanced 3D imaging technique in mice to reveal how receptors in the nose help decode the smell of complex odor mixtures. The findings shed light on how the brain perceives odors and may help reveal why some diseases cause a loss of smell.

Hairy human skin generated from stem cells

Scientists have been able to grow human skin outside the body for over 40 years. However, skin grown in cultures lacked the embedded structures, like hair follicles and sweat glands, found in real skin. Researchers were able to create hair-growing skin from human stem cells and graft it to mice. The lab-grown skin could aid in the study of skin diseases and skin reconstruction after burns and wounds.



Researchers create developmental map of mouse cochlea

Hearing involves thousands of tiny hair cells inside the cochlea, a snail-shaped organ in the inner ear. In humans, hair cells can't regenerate when they're damaged. Loud sounds, disease, injury, and aging can all damage hair cells and result in permanent hearing loss. Scientists mapped how these sensory cells develop in the mouse cochlea. Understanding cochlear development could help researchers working on therapies for several forms of hearing loss.