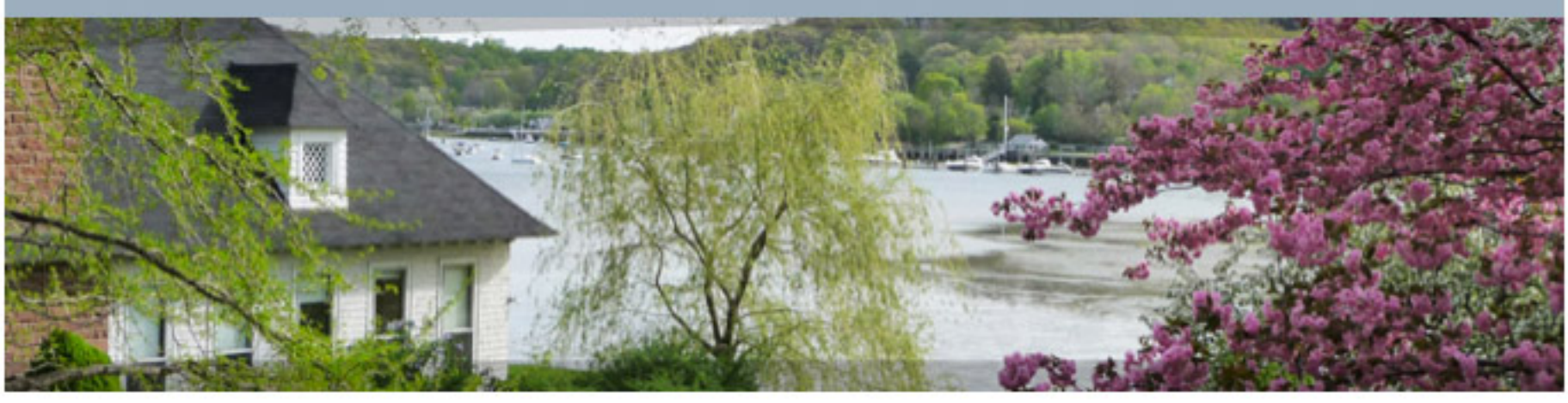
Cold Spring Harbor Laboratory — June 2013 NetLetter



::: CSHL in the News

Medical Daily
Scientists Link Specific Brain Cell Types to Behavior
May 27, 2013

Nature
Science mojo: Gradually diminished, instantly replenished
May 19, 2013

Long Island Business News
Newsmaker of the week, Broad Hollow Bioscience Park
May 17, 2013

Newsday
Cuomo urges closer university-business ties
May 15, 2013

Huntington Patch
Nobelist honored at Cinema Arts Centre
May 15, 2013

Times Beacon Record
CSH's Tony Zador: studying the brain's wiring
May 7, 2013

Nature Medicine
Biomedical journal and publisher hope to bring preprints to life
May 7, 2013

Nature
James Watson: Postdocs should travel, talk, and think big
May 3, 2013

::: "In Quotes"

Assistant Professor Michael Schatz quoted in **Nature**
Tepid showing for genomics X prize
May 29, 2013

Professor Gregory Hannon quoted in **Nature**
Privacy protections: The genome hacker
May 8, 2013

Assistant Professor Alexander Krasnitz quoted in **Newsday**
Scientists unearth genetic keys to 2 cancers
May 6, 2013

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CSHL wins top performance awards for our electronic newsletter

::: Upcoming Events

Public Lecture: Alternative Medicine - Sense and Nonsense
Saturday, June 8

LI 2-Day Walk
Saturday, June 8
Sunday, June 9

20th Annual CSHL Golf Tournament
Tuesday, June 11

Public Lecture: Untangling Dementia - Latest research and treatments
Tuesday, June 25

Science Walking Tours
Saturday, June 8, 22 & 29

2013 DNALC Summer Camps
Registration now open

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'Should I stay...or go?'

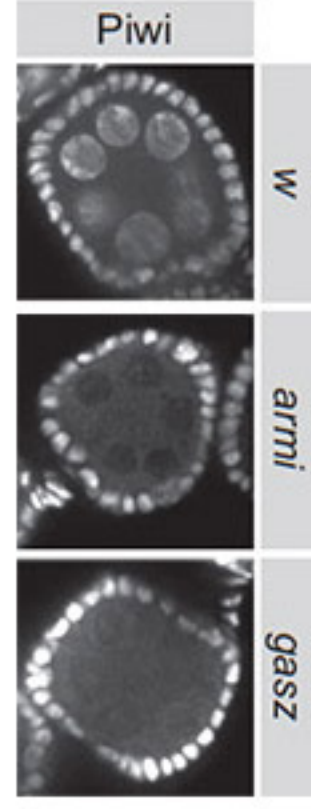
While scientists are working very hard to describe the circuitry of the brain and to model behavior, it has been very hard to link the two. "There's a big gap in our knowledge between our understanding of neuron types in terms of their physical location and their place in any given neural circuit, and what these neurons actually *do* during behavior," says Assistant Professor **Adam Kepecs**, whose team has now provided such a **link**. They studied the activity of two types of inhibitory neurons during a test in which mice had to look for a reward, which consisted of a drink of water.

Credit: Wikipedia Commons

They show, in a **paper** published in *Nature*, that when the mice made a decision to enter or stay in the area with the water, the activity of one particular type of neuron decreased, but when the mice decided to leave the area another type of inhibitory neuron rapidly fired with increased activity, resetting the flow of impulses. It's the first time specific brain cell types have been conclusively linked to a particular behavior pattern in mice - a "stay-or-go" pattern called foraging behavior.

Picturing discovery: How sperm and egg defend themselves

Each of these three images from the laboratory of Professor and HHMI Investigator **Gregory Hannon** shows an egg chamber in the ovary of a fruit fly. Two teams of postdoctoral researchers in the lab performed painstaking experiments over the last year (just published in *Molecular Cell*, ***here*** and ***here***) which flesh out many "missing" components of an innate system that defends sex cells - the carriers of inheritance across generations - from the ravages of transposable genetic elements.

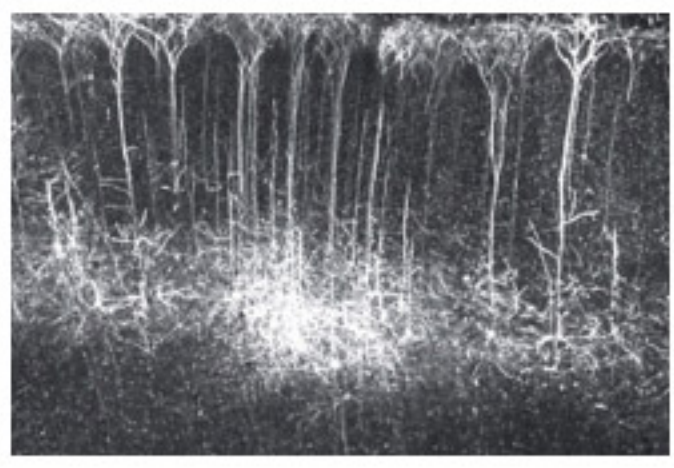


When activated, these troublesome segments of DNA, also called jumping genes or transposons, can copy and insert themselves at random spots across the chromosomes. In sperm and egg cells the proliferation of transposons can be particularly devastating, causing severe developmental impairments in offspring as well as sterility. Over the eons of evolution, complex organisms have developed means of defending their germline genomes against transposons, principally via a series of mechanisms that scientists call the piRNA pathway. Central to that pathway is a protein called Piwi.

The top image is the normal state with transposon control operative; the six circular areas are fly ovary nuclei, tagged to reflect the presence of the Piwi protein. Piwi is absent in the middle and bottom images, in which, respectively, genes called *armi* and *gasz* have been knocked down. These are two of the genes found by the Hannon lab to be essential for transposon control in the female germline. When the genes are knocked down and Piwi is absent, the door is opened to transposon activation and possible damage to the germline. **More details**.

In one ear . . .

What happens, *exactly*, when we hear a sound? Imagine you're crossing the street and hear the screech of a car's brakes. "We know that sound is coming into the ear; and we know what's coming out in the end - a decision," in the form of a muscle movement, says Professor **Anthony Zador**, an expert on the auditory cortex. If sound cues suggest the skidding car is approaching to your right, you'll probably move to avoid it, almost instantly. The surprise, Zador says, is the destination of the information used by animals - mice, in his experiments - to perform the task of discriminating between sounds of high and low frequency, as revealed by **newly published** work in his lab. "It turns out the information passes through a particular subset of neurons in the auditory cortex whose axons wind up in another part of the brain, called the striatum," says Zador. While there are many neurons registering "high" and "low" in the auditory cortex, only a few "representative" neurons transmit the "votes" cast by the many to the striatum, where decisions are made and actions taken. **Read more** about neural population coding.



Founded in 1890, Cold Spring Harbor Laboratory (CSHL) has shaped contemporary biomedical research and education with programs in cancer, neuroscience, plant biology and quantitative biology. CSHL is ranked number one in the world by Thomson Reuters for impact of its research in molecular biology and genetics. The Laboratory has been home to eight Nobel Prize winners. Today, CSHL's multidisciplinary scientific community is more than 360 scientists strong and its Meetings & Courses program hosts more than 12,500 scientists from around the world each year. Tens of thousands more benefit from the research, reviews, and ideas published in journals and books distributed internationally by CSHL Press. The Laboratory's education arm also includes a graduate school and programs for undergraduates as well as middle and high school students and teachers. CSHL is a private, not-for-profit institution on the north shore of Long Island.