“You’re listening to Brain Talk, from the Johns Hopkins Brain Science Institute.”

**Dr. Zee:** “An acute attack of vertigo is one of the most debilitating things one can experience. First of all you feel you’re spinning when you’re not, you lose your balance, the whole world is moving past by very fast, you can’t focus on anything, and pretty soon you start to feel nauseated, sick to your stomach.”

**Dale:** “David Zee is a neurologist at Johns Hopkins University School of Medicine. He works with patients who have problems with balance and dizziness.

Today on Brain Talk: how the ear helps keep us upright and clear-headed.”

**Dr. Zee:** “Our field of specialty is called neurotology, because it combines the brain and the ear, is to better diagnose patients who have ill-defined, hard to describe dizziness and imbalance, to better find treatments from the point of view of medication as well as physical therapy programs.”

**Dale:** “Dr. Zee says there are many reasons people get dizzy. It could be caused by medications, low blood sugar, hormonal problems -- or simply by being up high. The most common cause, says Dr. Zee, is when small calcium carbonated crystals in our inner ear get dislodged. The cure: basic physiotherapy.”

**Dr. Zee:** “You basically, lie on your bad side, turn over to your good side and then sit up quickly, and you put the right pattern in motion together and you move those little stone out of the bad part of the inner ear and into the right place. It is a little like tilting a pinball machine and getting the ball in the hole.”

**Dale:** “Dr. Zee and his team were curious why people who work near an MRI machine, or go into one, often feel dizzy. The scientists discovered MRI’s magnetic field can directly affect the inner ear. More precisely, the magnetic field stimulates the labyrinth in the ear.

Dr. Zee calls the ear’s labyrinth the gold standard for balance. It contains fluid filled canals, and lets us know if we are upright or tilted, spinning or rotating.”

**Dr. Zee:** “So when we rotate our heads, from side to side, up and down, for example, the fluid moves a bit, pushes on some sensors, little hair cells in the inner ear and when they get pushed they send a new signal to the brain and the brain says ah ha, I must be spinning.”

**Dale:** “The discovery about MRIs stimulating the ear’s labyrinth is giving scientists at Johns Hopkins a new research tool to study dizziness and find new treatments. To that end, they’ve been putting small tanks of fish in MRI machines. They found, like humans, fish get dizzy too.”
**Dr. Zee:** "So we have a simple behavioral measure of how fish's inner ear mechanisms are responding. This has a potential for us to test the effects of new medications and toxicity of drugs in the simple MRI machine inducing activity in their inner ear."

**Dale:** "Dr. Zee says dizziness is challenging because it's often hard to diagnose. He says it's remarkable that all of us aren't dizzy all of the time in our modern world."

**Dr. Zee:** "We have not evolved mechanisms to deal with fast video games, 3D movies, going on treadmills; these are all actually unusual types of activities as far as the brain is concerned, so all of us should be dizzy."

**Dale:** "To learn more about how the ear helps keep us upright and clear-headed, log onto brainscienceinstitute.org. I'm Dale Connelly, and this is Brain Talk from Johns Hopkins University."

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Learn more about Dr. Zee
Learn more about the Johns Hopkins Ocular Motor Physiology Lab
Learn more about vestibular disorders
Read article on how MRI's affect the fluid in the inner ear
Read article from *Current Biology* – "Neurophysiology: Vertigo in MRI Machines"

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