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## Minute organs in the ear can alter brain blood flow



The balance organs live deep inside the ear

**Minute organs hidden deep within the ear appear to directly alter blood flow to the brain, scientists have revealed.**

Until now, experts thought the inner ear's job was to control balance alone.

But the Harvard Medical School team, working with Nasa, found the balance organs also affect brain blood flow in their study involving 24 people.

They told BMC Neuroscience journal that the connection probably evolved to enable man to stand upright and still get enough blood up to the brain.

The organs of balance are deep within the ear, inside a maze of bony chambers.

### **Off kilter**

Two sacs, called the utricle and saccule, make up the inner ear's vestibule and three fluid-filled loops, known as the semi-circular canals, detect the rotation and tilting movements of the head.

Dr Jorge Serrador and his team from Harvard Medical School asked 24 healthy people to undergo a range of tests normally used on astronauts.

These included a tilt test where the individual sits strapped to a chair that is then tilted to different angles, plus a ride inside a giant, spinning centrifuge.

In this way, the researchers were able to stimulate the different parts of the balance organs and monitor the effects on blood flow around the body.

This revealed that the utricle and saccule, also known as the otoliths, directly affected brain blood flow regulation, independent of other factors, such as blood pressure.

Dr Serrador explained why the connection may exist: "Standing up places the head above the heart and thus makes it harder to provide blood flow to the brain.

"Having a connection between the otoliths, which tell us that we are standing, and the cerebrovasculature may be part of the adaption that allows us to maintain our brain blood flow when upright.

"The knowledge gained from this study might lead to new treatment options for these conditions."

“ **Standing up places the head above the heart and thus makes it harder to provide blood flow to the brain**

Dr Jorge Serrador

### **Age link**

For example, some people who suffer from faints and dizzy spells when they stand up quickly, known as postural hypotension, could have poor brain blood flow linked to underlying inner ear problems, he said.

Ear, nose and throat expert Andrew McCombe, of ENT UK, said the balance organs may be one of the many reflexes that ensures our blood is sent to where it is needed.

"It makes sense that any organ that tells you that you are standing upright and not lying down will do this.

"And we know that as we age the whole inner ear does not work so well, so this may be involved in postural hypotension."

But he said it was only a small part of the equation, alongside the heart and blood vessels.