

Specific gut bacteria may be associated with pulmonary arterial hypertension

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Researchers have identified a distinct collection of bacteria found in the gut that may contribute to and predict the development of pulmonary arterial hypertension (PAH), according to new research published today in the American Heart Association's journal *Hypertension*.

PAH is a chronic and progressive disease in which the arteries that [supply blood](#) to the lungs are constricted, resulting in symptoms such as shortness of breath, heart palpitations, fatigue and others. In PAH, persistently [high blood pressure](#) in lung arteries makes the right side of the heart work too hard to pump [blood](#), resulting in right-sided heart failure (inability of the heart to pump blood adequately). It is much less common than systemic blood pressure, which represents the force of blood moving through blood vessels throughout the entire body.

Everyone has a collection of [bacteria](#) in their gut—known as microbiota—that aid in digestion. The researchers found that having a specific microbiota profile in their gut predicted the presence of PAH with 83% accuracy.

"We showed for the first time that specific bacteria in the gut are present in people with PAH. While current PAH treatments focus on the lungs, looking at the [lung/gut](#) axis could open the door to new therapies centered in the digestive system," said Mohan Raizada, Ph.D., lead study author and distinguished professor in the department of physiology and [functional genomics](#) at the University of Florida College of Medicine in Gainesville, Fla.

For the study, stool samples were collected from 18 PAH patients and 12 people without a history of cardiopulmonary disease. The microbiota

DNA from the stool samples were isolated and sequenced. The testing revealed a group of bacteria unique in the PAH patients that were associated with PAH.

This is the first link between a specific collection of bacteria and pulmonary arterial hypertension. However, it is not the first time that gut bacteria have been connected to medical conditions. A variety of different gut microbiota profiles have been linked to a variety of cardiovascular diseases including high blood pressure.

"We were very surprised to see such an association within a small group of study subjects," said Raizada. "It usually requires hundreds of patients to achieve such significance."

Gut microbiota are constantly changing, depending on what we eat, our environment and especially our genetic makeup. However, Raizada said the bacteria associated with PAH are unique and do not seem to change: "We believe these particular bacteria are constant."

If the results are validated in a larger study, the researchers said that the unique bacterial profile could help to diagnose PAH early, possibly replacing the invasive [heart](#) catheterization that is used today to diagnose the disease. Also, new types of treatment focused on altering the gut microbiome of PAH patients could be developed, providing new hope for halting the progression of the disease.

Another important question to be researched is how the gut bacteria impacts the lungs of PAH patients. "We do not know if and how gut bacteria and viruses make their way to the lungs," said Raizada. "Some studies have pointed to an increased incidence in intestinal leakage among people with pulmonary hypertension, which may allow some intestinal bacteria to get into the bloodstream and circulate to the lungs where they can cause inflammation and lead to vascular changes."

"There is still the question of whether the specific [microbiota](#) associated with PAH is the cause or the result of the disease, therefore, more research is needed," concluded Raizada.

More information: *Hypertension* (2020). [DOI: 10.1161/HYPERTENSIONAHA.119.14294](#)

Provided by American Heart Association

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