

Genetically-modified probiotic may one day treat pulmonary hypertension

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Credit: American Heart Association

An oral, genetically-modified strain of the probiotic *Lactobacillus* was used to treat rats with high blood pressure in the lungs, which resulted in reduced blood pressure, improved heart contractility, and reduced heart wall thickness, according to a study presented at the American Heart

Association's Council on Hypertension 2016 Scientific Sessions.

High blood pressure in the lungs is known as pulmonary hypertension. In pulmonary hypertension, the heart must work harder to pump blood from the heart through the arteries of the lungs, which puts added strain on the heart. Risk factors for pulmonary hypertension include family history, [congenital heart defects](#), cocaine use, and chronic lung disease.

"It is known that the peptide Angiotensin-(1-7), or Ang-(1-7), is beneficial for the treatment of pulmonary hypertension in animal experiments. But taking this peptide orally hasn't been effective because it's easily degraded in the stomach," said Colleen Cole Jeffrey, M.S., study author and graduate research assistant in the department of Physiology and Functional Genomics at the University of Florida in Gainesville. "To overcome this obstacle, we genetically engineered strains of Lactobacillus, a probiotic bacteria, to express and secrete Ang-(1-7). And in an animal study, we tested whether oral feeding of these modified bacteria would effectively treat pulmonary hypertension."

Researchers measured the thickness of the rat heart wall and the ability of the heart to contract, as well as the [systolic blood pressure](#) in the right side of the heart, which is a marker for pulmonary hypertension.

"All the animals with pulmonary hypertension had elevated blood pressure, increased heart wall thickness, and decreased cardiac contractility compared to normal animals," Cole Jeffrey said. "However, the group of pulmonary hypertensive animals that were fed with the Ang-(1-7) probiotic had a 43 percent reduction in [blood pressure](#), a 33 percent reduction in heart wall thickness, and a significant improvement in heart contractility, compared to the untreated animals with pulmonary hypertension."

These findings are experimental, but they suggest that probiotics can be modified for oral delivery of beneficial peptides such as Ang-(1-7), and consumption of these modified probiotics may treat pulmonary hypertension and associated right [heart](#) dysfunction, she added.

"Certainly, there is still much more work to be done," said Mohan Raizada, Ph.D., principal investigator of the study. "But if our animal data holds true in clinical trials, probiotic consumption, as well as the use of genetically-modified probiotics, may emerge as a novel therapeutic approach for [pulmonary hypertension](#) therapy – either as standalone treatment or in conjunction with other medical therapies."

Provided by American Heart Association

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