The National Institutes of Health has awarded the Oklahoma Medical Research Foundation $2.1 million to investigate a potential genetic cause of degenerative heart valve disease.

"Like everything else in the body, heart valves degenerate as we age," said OMRF cardiovascular biologist Sathish Srinivasan, Ph.D., who received the four-year grant. "But some people experience it earlier than others."

According to the Centers for Disease Control and Prevention, heart valve disease affects about 2.5% of the U.S. population and close to 13% of people aged 80 and older. Although medication can treat symptoms, no drugs exist to prevent the disease or repair damaged valves, Srinivasan said. In the two most common forms of the condition, blood either leaks back into the heart or the valve becomes stiff and narrow, preventing blood from passing through.

Known genetic predisposition explains about 1 in 10 cases of heart valve disease, Srinivasan said. In those cases, researchers have identified the responsible genetic variants. He believes that within the remaining 90%, a lifestyle factor such as smoking, poor diet or lack of exercise may flip a switch in people with unidentified genetic variants. "We suspect that reaction negatively affects a valve's ability to repair itself and regenerate tissue during normal wear and tear," Srinivasan said.

Vascular valves, far smaller and more plentiful than heart valves, are found in blood vessels and lymphatic vessels. Srinivasan's lab was the first to observe that the genes that regulate the formation and regeneration of vascular valves also are found in heart valves.

In his new study, his lab will use research models to determine what happens to heart valves when a gene known to be critical in vascular valves is turned off.

"We expect to find that the absence of this gene causes heart valves to age rapidly," Srinivasan said. "If our hypothesis is correct, we can focus on how the gene functions and eventually work toward therapies that prevent heart valves from aging prematurely."

OMRF scientist Lijun Xia, M.D., Ph.D., noted that degenerative heart valve disease can lead to heart failure or even death.

"Our current understanding of various causes of this condition is incomplete," said Xia, who leads OMRF's Cardiovascular Biology Research Program. "Dr. Srinivasan and his team are making substantial headway on one particular cause, with a goal of someday identifying targets for new medications."