TTK Healthcare
LIMITED

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Company Code	:	**3153**
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Dear Sirs,

Re : Development of Low Cost Prosthetic Heart Valves for India – Press Release by PSG Institute of Medical Sciences and Research, Coimbatore

PSG Institute of Medical Sciences and Research (PSG IMSR), Coimbatore is working on developing **Low Cost Prosthetic Heart Valves for India** in collaboration with **Colorado State University** (CSU) and **The Ohio State University** (OSU), funded through a grant from **National Institutes of Health** (NIH). **TTK Healthcare Limited** would be the **"Industry Partner"** in this Project.

In this connection, we are forwarding herewith the Press Release made by PSG IMSR at the Press Meet held today at Coimbatore.

As you will note from the Press Release, **the role of TTK Healthcare Limited** in this Project, as Industry Partner, would be to **commercialize the technology** as and when it is **fully developed and ready for commercialization after all regulatory clearances**.

Kindly take the above information on record.

This is just for your information.

Thanking you

Yours faithfully
For TTK Healthcare Limited

(S KALYANARAMAN)
Director & Secretary

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PSG Institute of Medical Sciences & Research & PSG Hospitals

PRESS RELEASE

Researchers at PSG Institute of Medical Sciences and Research, Colorado State University & The Ohio State University are Creating Low Cost Prosthetic Heart Valves for India

COIMBATORE – Researchers at PSG Institute of Medical Sciences and Research in India (PSG IMSR), Colorado State University (CSU) and The Ohio State University (OSU), in the USA, are working on developing low cost replacement heart valves that promise to be superior to current mechanical and tissue-based heart valves and reduce patients' need for medication to prevent blood clots.

This consortium is supported by a two-year joint grant from the National Institutes of Health (NIH) in the United States, and Department of Biotechnology (DBT) in India. Associate Professor and Principal Investigator Lakshmi Prasad Dasi lead the US efforts while Cardio-thoracic surgeon and Principal Investigator Dr. Murugesan lead the Indian efforts. Working with their team members they will realize a revolutionary heart-valve design much better than current heart valve alternatives for young patients, particularly from low resource setting. Dr.Chandrasekar (Chandra) from CSU, leads the management of this unique international collaboration. The result will be novel heart valves made from plastic materialsto address the problems associated with rheumatic heart valve disease, which is the most common form of valve disease in developing nations.

"There is a strong need for low cost heart valves that do not need anticoagulation in India," explained Dasi, whose expertise is in heart-valve engineering and cardiovascular biomechanics. "Patients who receive mechanical heart valves must remain on lifelong medication to prevent blood clotting which suffers from its own set of side effects and complications. On the other hand, bioprosthestic valves, usually made from animal tissue, are prone to hardening over

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timeand don't last more than 10 to 15 years. Such valves cannot be implanted in these patients because most of them are young with rheumatic valve disease, and would need repeated open-heart surgery to replace the worn out bioprosthetic valves. The artificial heart valves to be developed in this project will be made from flexible plastic materials containing hyaluronan, a molecule found throughout the body and in the natural heart valve tissues. The valve design will be optimized for superior performance over a much longer period of time without the need for anticoagulation therapy."

Co-investigators on the project are Susan James, professor and head of the Department of Mechanical Engineering and an expert in polymers, and associate professor Ketul C. Popat, an expert in bio-compatibility and surface nano-engineering and Professor Chandra who will manage the international collaboration. Dasi, James and Popat invented the core technology for this project.

The engineering team is closely working with Dr. Christopher Orton, a veterinary cardiothoracic surgeon and head of the Department of Clinical Sciences in the College of Veterinary Medicine and Biomedical Sciences at CSU, who will work with Dr. Murugesan's team to implant prototype valves in pigs and sheep as part of the pre-clinical evaluation. The entire pre-clinical trial will take place in India with involvement from TTK Healthcare Limited, the manufacturer of the TTK Chitra Heart Valve. If successful, TTK Healthcare Limited will seriously consider investing in commercialization of the technology. Dr.Ramalingam, Dean, PSG IMSR & Hospitals and Dr.Murugesan Chief of Cardiac Surgery added that PSG has a strong tradition of research, and innovation and were happy that a low cost device with bio-friendly properties would certainly change the outlook for the patients, both young and old alike.

"In addition to reducing the need for anti-coagulation in young Indian patients, the next generation heart valves will allow for easy automated manufacturing, as opposed to the laborious process currently used to manufacture tissue valves," Dasi said."The goal is to reduce the cost of the device, as anti-coagulation is both risky and expensive while the current gold standard bio-prosthetic valves are not affordable and lack the durability needed to be implanted in a young patient. Currently, over 290,000 heart valve procedures are performed

annually worldwide and that number is estimated to triple to over 850,000 by 2050, an expansion rate of 10 percent to 12 percent per year. Due to various causes including lifestyle changes, heart disease in general is increasing at a higher rate in India."

In addition to implantable low cost heart valves, the team hopes their innovativestrategy can be translated and engineered as a trans-catheter heart valve, thereby eliminating the need for open heart surgery. This is particularly important in India given that there is a significantly higher risk of dying from post-operative infection of the surgical wound in India than in the United States. A trans-catheter approach would greatly reduce the size of the incision and hospital recovery time.

Research on developing the new and improved heart valves will be conducted at the Dorothy M.DavisHeart andLung Research Institute in the Medical Campus at The Ohio State University, and the new Suzanne and Walter Scott, Jr. Bioengineering Building at CSU. PSG has opened a new lab for conducting the pre-clinical studies in pigs and sheep in Coimbatore.

"While the three universities are geographically apart, the barriers come down by the sheer interest and the need of stakeholders," Chandrasaid. The new globally connected research enterprise at CSU, OSU and PSG will join forces to bring the research ideas into practice in unique ways, made possible through this unique international collaboration.

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