ROBOTIC TOOL FOR VITREORETINAL SURGERY WINS EURETINA INNOVATION AWARD

A DEVICE designed to provide robotic assistance for micrometre precision in vitreoretinal surgery has been awarded first prize in the third EURETINA Innovation Award.

At an award ceremony held during the EURETINA Congress, Marc de Smet of Clinique de Montchoisi, Lausanne, Switzerland, received a cheque for €20,000 in recognition of the work achieved in bringing the robotic project to fruition.

Second prize and a cheque for €10,000 was awarded to Robert MacLaren of the University of Oxford, UK for his research into the development of the AAV.REP1 vector for the delivery of genes in incurable retinal diseases such as choroideremia.

Praising the high standard of the entries received for the EURETINA Innovation Awards, Prof Einar Stefansson PhD, chairman of the Judging Panel, said that the quality of the contributions underscored the dynamic nature of retinal research at the moment and had presented the judging panel with a very difficult evaluation task.

Presenting the features of the PRECEYES robotic surgery system for vitreoretinal surgery, Dr de Smet said that the device answers a very real market need.

"Vitreoretinal procedures have reached the limits of human precision movement. The micro-precision provided by PRECEYES can facilitate research in new therapies for currently incurable diseases and can also help to reduce the learning curve for new procedures and therapies. Furthermore, a well-operated, integrated system could execute and speed up procedures such as vitrectomy, macular peeling or laser photo-coagulation," he said. Dr de Smet added that integration with 3-D digital imaging and with smart sensors will lead to the automation of precise procedures that will revolutionise the field.

Einar Stefansson (left) presents Marc de Smet with first prize in EURETINA Innovation Award

About 1.3 million vitreoretinal procedures are carried out worldwide every year in approximately 2,700 operating theatres with a growth rate of four per cent per year, said Dr de Smet.

"At 1,000 vitreoretinal procedures a year per operating theatre, a PRECEYES system would add a cost of less than €60 per procedure. This would be financially attractive if it leads to five per cent more procedures through reduced theatre time, additional procedures for currently undertreated patients and use of smaller, less complex operating room facilities," he said.

Dr de Smet pointed out, however, that the nature of breakthrough innovations means that the patient and financial benefits of the device have still to be proven in practice by clinical research.

In initial trials of the device, reproducibility tests show that the robotic system could provide an intrinsic precision of 2 to 10μm, depending on the degree of freedom. This precision is calibrated at the tip of the instrument when positioned at the retina, which represents an improvement of 10 to 20 times compared to the human hand. As such, the system enables treatment of manually untreatable levels, he said.

"This tool will ultimately help improve and extend existing VR procedures, and enable new ones," he concluded.

Prof MacLaren's second-placed entry highlighted the significant progress made using the modified AAV-2 vector in the gene therapy clinical trial for choroideremia which were published early in 2014.

Robert MacLaren receives second prize in EURETINA Innovation Award

The gene therapy approach developed by Prof MacLaren's team used a small, safe adeno-associated viral (AAV2) vector to carry the missing choroideremia gene into the light-sensing cells in the retina. To inject the virus, the patient's retina was first detached and then the virus was injected directly into the subretinal space. After six months, the patients showed significant improvements in vision in dim light and two of the six were able to read more lines on the eye chart.