

John Mitchell Crouch 1940-1977



WORLD-LEADING RESEARCH

John Mitchell Crouch (JMC) Fellowship funds research into key body responses post trauma that could save lives

The 2015 recipient of the College's prestigious John Mitchell Crouch (JMC) Fellowship, Professor Zsolt Balogh, has used the attached funding to help pay for equipment to advance his world-leading research into polytrauma, traumatic shock and Multiple Organ Failure (MOF).

Professor Balogh is the Director of Trauma at the John Hunter Hospital and Hunter New England Health District and is the Professor of Surgery and Traumatology at the University of Newcastle.

While he has been a leading Orthopaedic and Trauma surgeon and scientist for many years, Professor Balogh's most recent investigations centre on developing a greater understanding of the interaction between leukocytes and mitochondrial DNA.

This interaction, only discovered in the past decade, is now believed to drive the body's post-trauma inflammatory response which can lead to MOF, the most common cause of mortality for those trauma patients who survive the initial days following injury.

Professor Balogh used the JMC Fellowship funds to help pay for a state-of-the-art flow cytometry system that

enables him to conduct the rapid and detailed patient blood analysis required for surgical research at the John Hunter Hospital and University of Newcastle.

He said he began this stream of research to understand why severely injured trauma patients often suffered MOF three to five days post injury even though there was no sign of infection or specific damage to the organs and after researchers in America had found increased levels of free floating mitochondrial DNA in the blood of severely injured patients.

"The patients we are treating and researching are those who, in the past, would not have survived their injuries and the inflammatory response we are now seeing is like the body trying to self-destruct to end the suffering," Professor Balogh said.

"In other words, we are witnessing the results of a huge destructive energy transfer to the body, which has not been seen in the past because those patients could not be saved.

"We know that mitochondria controls life and death, that it is these genes that shut cells down when they decide it's time for the body to die and that it is mitochondrial DNA that is released from dying cells.

"We also know that mitochondrial DNA is ancient in its structure and that it resembles and functions much like a bacteria and that when it is released from cells it deranges the body's immune system, triggering the uncontrolled inflammatory response which manifests in MOF.

"We now believe this is because leukocytes respond to the mitochondrial DNA as they would to bacteria, which is a wonderful revelation because nobody knew that cells could react this way in the absence of infection."

Professor Balogh said he hoped the work would give surgeons a greater understanding of post-injury inflammatory processes and help reduce the occurrence of MOF, which has a current mortality rate of 25 per cent, compared to only three per cent of ICU polytrauma trauma patients who avoid MOF.

"We have found four independent predictors of MOF," he said.

"They are the severity of the injury, the severity of blood loss, the patient's genetics and the management of the patient, including surgical interventions.

"We can't do anything about how severely they're injured or their blood loss, we can't change how genetically

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prone they are to inflammation, but we now know that the way we manage their treatment can directly impact on the degree of organ failure they will suffer.

“This could mean that while traditional thinking had it best for trauma surgeons to wait before conducting surgeries to stabilise the severely injured patient, faster intervention could actually reduce complications.

“In fact, I think we can do earlier stabilisation interventions than we previously thought, particularly orthopaedic surgeries, because studies have shown that immobilisation poses a greater risk to injured patients by creating stress that can further enhance the inflammatory response.”

Professor Balogh’s research was facilitated by the Hunter New England Health District, the Hunter Medical Research Institute and the University of Newcastle. His key local collaborators are Professor Phil Hansbro and his immunology team from the Hunter Medical Research Institute and University of Newcastle genomics expert Dr Doug Smith.

Originally from Hungary, Professor Balogh moved to Australia in 2005 after he was offered the position of Director of Trauma at the John Hunter Hospital and is now a dual citizen of both countries.

He received his MD and PhD at the Albert Szent-Gyorgyi Medical University in Hungary where he also completed his clinical training in Orthopaedics and Traumatology before completing several trauma Fellowships in the US and Australia.

Since his arrival in Australia, he has established the Traumatology Research Group through the University of Newcastle which has extensive national and international research collaborations with institutions such as Cornell University, USA, Leeds University, UK, the University of Aachen, Germany, the University of Texas-Houston Medical School, USA, and the AO Research Institute, Switzerland.

Among many editorial roles, he is an associate editor of the World Journal of Surgery. Professor Balogh has published 150 peer reviewed papers (H-index: 29, IF>500, Citations >4500), he is the current President of the Australian Orthopaedic Trauma Society, has held leadership positions in the Australian Orthopaedic Association, the RACS and the American Association for Surgery of Trauma and has received 22 national and international awards for his research.

However, despite such success and recognition, Professor Balogh said he was most proud to receive the JMC Fellowship, which is the highest accolade bestowed by the RACS.

“I was absolutely thrilled to be chosen because this is a Fellowship that I respect very highly,” Professor Balogh said.

“When scientists apply for most grants, we have to specify how we will

spend the money right down to details like photocopying costs, which is time consuming and dreary and a process almost designed to snuff out the spark of scientific curiosity.

“However, to receive the JMC Fellowship is to receive both wonderful professional support and crucial financial support from the College and Fellows.

“It is an amazing gesture that says, in effect, we like your work so here is some money so you can do even better work in the future.

“I don’t know of any similar Fellowship bestowed by any medical College anywhere else in the world and it is now recognised internationally as providing unique support to, and recognition of, the value of surgical science.

“The funding provided by the JMC Fellowship also came at a perfect time when I was trying to find the funds to equip our Surgical Sciences Laboratory at John Hunter Hospital.

“The new equipment allows us to continue to improve our care of the severely-injured patient and disseminate our findings out to the broader surgical profession both here and abroad. Our research focus on sterile inflammation has major relevance to many other pathologies such as cardiac disease, stroke, cancer, pancreatitis, thrombosis and rheumatological disorders.

“Even after working in this field for more than 20 years, I still find the research into the biological mechanisms driving the physiology of injury fascinating because still so little is known about it.”

The JMC Fellowship, first awarded in 1979, is the premier research award bestowed by the RACS to surgeons considered to be making outstanding contributions to surgical science and research.

With Karen Murphy



Zsolt Balogh and Michael Grigg