



Robert Joseph White



Duluth, USA, 21 Jan. 1926 - Geneva, Switzerland, 16 Sept. 2010

Nomination 29 Mar. 1994

Field Neurosciences, Brain Surgery

Title Chairman, Emeritus, of Neurosurgery and the Brain Research Laboratory, Case Western Reserve University

Commemoration – Robert Joseph White was born in 1926 in Duluth, Minnesota. There he went to school, received his Bachelor of Science at the University of Minnesota and a medical degree from the Harvard University School of Medicine. He did his surgical residency at Peter Brigham Hospital and a neurosurgical fellowship at the Mayo Clinic, which he subsequently joined as a member of the staff to become eventually the chairman of the Department of Neurosurgery. He was a brilliant surgeon, interested in experimental research. His group was the first to accomplish the total isolation of the brain in the experimental animal. They succeeded in maintaining its viability through the use of extracorporeal systems. He was also the first to successfully transplant and hypothermically store the mammalian brain, with survival for extended periods of time. When I asked him four years ago, here in this place, after his lecture at our Academy, ‘Why don’t you present a movie in colour of your transplanted brains?’, he answered, ‘Very few in the audience would stand the view of blood in such an amount, covering not only the operating table but most of the operating room’. It was a demanding skill to do such research, plus, of course, he was an excellent clinical surgeon. But it is especially the study of cerebral physiology and biochemistry at the very low temperatures that have been among his most important contributions. Just to approach it a little bit, for those of you who don’t deal with patients every day, here in Rome and in my country as well, almost every day in intensive care we get at least one patient who underwent resuscitation following sudden cardiac arrest. In some of them, the heartbeat is restored and they breathe spontaneously but their consciousness does not return. They move to the state of existence unknown to man in all his history. They live what we call *vita vegetativa*. The crucial point is the time of starting resuscitation. If it exceeds three to four minutes, the cerebral damage is done. Hypothermia could extend this vital period up to several minutes. The results of Dr White brought about an understanding of why the brain is protected during periods of circulation reduction or arrest under hypothermic conditions. His studies led to the introduction of a number of new techniques in operating neurosurgery, including the utilization of low temperature states for the treatment of acute spinal cord trauma and protection of the brain during intracranial surgery. Over the last three to four years we have started to use, in intensive care, cool blankets right after resuscitation, and this is also an impact of Dr White’s studies. Many honours and awards were conferred upon Robert White for his outstanding surgical skills and experimental work. He regularly attended Academy meetings, accompanied by his wife. He was a warm, friendly, open person. He died a few weeks ago. The memory of his valuable contribution to medicine and to the growth of our Academy will always be cherished. We shall remember him in our thoughts as our beloved colleague and friend.

Andrzej Szczeklik

Most important awards, prizes and academies

Awards, Honours, Citations: Mayo Clinic Research Award; Sir William Osler Lectureship; Ohio State Governor’s Award (1985); Freeman Award and Medal, National Paraplegia Foundation; Distinguished Membership, the Academy of Medicine; Catholic Man of the Year, Knights of Malta (1994); Knight of Columbus; Knight of the Equestrian Order of the Holy Sepulchre of Jerusalem; National Health Professional of the Year (1988); Alumni Centennial Fellow in Natural Science, University of Saint Thomas; Svien Memorial Lectureship, Mayo Clinic; Medical Mutual Honor Award and Medal; Biographical citations: Modern Neurosurgical Giants, Who’s Who in the World, American Men of Science; Distinguished Alumni Mayo Clinic Foundation (1998);

Humanitarian Award of the American Association of Neurological Surgeons (1997); Golden Center Award for Accomplishments in Medicine (1999). *Honorary Degrees*: Doctor of Science, John Carroll University (1979); Doctor of Science, Cleveland State University (1980); Doctor of Humane Letters, Walsh University (1996); Doctor of Sciences, University of St Thomas (1998). *Honoured Lecturer*: Hospitals for Nervous Diseases, Queens Square, London (1958); Cleveland Clinic Foundation (1999); Harvard University (2000); Hastings College (2000). *Academies*: Society of University Surgeons; Society of University Neurosurgeons; Transplantation Society; American Physiological Society; American Society of Anatomists; American Federal for Clinical Research; Society for Experimental Biology; Russian Society of Neurosurgery; Ukrainian Neurosurgical Society; Latvian Neurosurgical Society; Faculty appointment to the Burdenkov Institute of Neurosurgery, Moscow; Faculty appointment to the Polenov Institute of Neurosurgery, Saint Petersburg; Faculty appointment to the Ukrainian Neurosurgical Institute, Kiev; American Society of Cryobiology; Russian and Ukrainian Academies of Medical Sciences; President, Academy of Medicine (1979-1980); President, Allen Memorial Library (1985); American Society of Artificial Organs; Transplant Society; International Society of Cybernetic Medicine; New York Academy of Medicine.

Summary of scientific research

Doctor White's group was the first to accomplish the total isolation of the brain in the experimental animal and maintain its viability through the use of extracorporeal systems. They were also the first to successfully transplant and hypothermically store the mammalian brain with survival for extended periods of time. This research documented, for the first time, the immunologically privileged state of the whole brain organ and demonstrated the unique neuro-chemistry of cerebral tissue at extremely low temperatures. As a result of these investigations, an entirely new understanding of cerebral physiology and bio-chemistry at extremely low temperatures has been established emphasizing the marked suppression of the energy requirements of brain tissue. These results have brought about an understanding of why the brain is protected during periods of circulatory reduction or arrest under hypothermic conditions. These studies have brought about the introduction of a number of new techniques in operative neurosurgery, including the utilization of low temperature states for the treatment of acute spinal cord trauma and the protection of the brain during and following intracranial surgery. These investigations have also extended the employment of hypothermia to the management of severe head injuries and acute cerebral vascular disease.

Main publications

White, R.J., Albin, M.S. and Verdura, J., 'Isolation of the Monkey Brain: In Vitro Preparation and Maintenance', *Science*, 141, pp. 1060-1 (1963); White, R.J., Albin, M.S. and Verdura, J., 'Preservation of the Isolated Monkey Brain Utilizing a Mechanical Extracorporeal Circulation', *Nature*, 202, pp. 1082-3 (1964); White, R.J., Verdura, J., Albin, M.S. and Bowen, H., 'Hypothermia Brain Storage With Electrical and Metabolic Recovery', *Physiologist*, 7, p. 283 (1964); White, R.J., Albin, M.S., Locke, G.E. and Davidson, E., 'Brain Transplantation: Prolonged Survival of Brain After Carotid-Jugular Interposition', *Science*, 150, pp. 779-81 (1965); Albin, M.S., White, R.J., Locke, G.E. and Kretchmer, H.E., 'Spinal Cord Hypothermia by Localized Perfusion Cooling', *Nature*, 210, pp. 1059-60 (1966); White, R.J., Albin, M.S. and Verdura, J. and Locke, G.E., 'Prolonged Whole-Brain Refrigeration With Electrical and Metabolic Recovery', *Nature*, 209, pp. 1320-2 (1966); White, R.J., Albin, M.S., Yashon, D. and Davidson, E., 'Metabolic Characteristics of the Isolated Primate Brain at Profound Hypothermic Levels', *J. Cryobiol.*, 3, pp. 374-5 (1967); White, R.J., 'Experimental Transplantation of the Brain', *Human Transplantation* (F.T. Rapaport and J. Dausset, eds.), Grune and Stratton, Inc. (New York, 1968), pp. 692-709; White, R.J., 'Preparation and Mechanical Perfusion of the Isolated Monkey Brain', *Karolinska Symposia on Research Methods in Reproduction Endocrinology*, 4th Symposium: Perfusion Techniques, October 11-13, 1971 (E. Diczfalussy, ed.), Karolinska Institute, pp. 200-16; White, R.J., 'Brain', Chapter 23 in *Organ Preservation for Transplantation*, (A.M. Karow, ed.), Little, Brown and Co. (Boston, 1974), pp. 395-407; White, R.J., Albin, M.S. and Verdura, J., Takaoka, Y., Massopust, L.C., Wolin, L.R., Locke, G.E., Taslitz, N. and Yashon, D., 'The Isolation and Transplantation of the Brain: An Historical Perspective Emphasizing the Surgical Solutions to the Design of These Classical Models', *Neurological Research*, 18, pp. 194-203 (1996); White, R.J., Angstwurm, H. and Carrasco de Paula, I., *The Determination of Brain Death and its Relationship to Human Death*, **Pontificia Academia Scientiarum**, Vatican City, 1989.