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GUEST EDITORIAL

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On 10 December 2012 it will be exactly 100 years ago that the Nobel Prize for Physiology or Medicine was awarded to Alexis Carrel (1873–1944) for his work on "vascular suture and the transplantation of blood vessels and organs" [1]. He was the 14th and youngest person since 1901. In that year the first Nobel Prizes were given, which is always on 10 December, the date the founder, Alfred Nobel (1833–1896) died.

Alexis Carrel was in good company, namely with Emil Adolf von Behring, Iwan Petrovich Pavlov, Ilyich Mechnikov, Paul Ehrlich and Emil Theodor Kocher, just to name few of his famous predecessors. As seen more often in history a dramatic event can lead to new developments, new techniques and new findings. During his surgical training period at the University Hospital of Lyon, Carrel was confronted with the fatal attack on the President of the French Republic, Mr. M. F. S. Carnot, during his visit to Lyon in 1894 by an anarchist. The President died after he was stabbed with a dagger in the abdomen because of massive bleedings caused by the fact that the large abdominal veins, in particular the portal vein, were cut. The treating surgeons could not save him because they could not reconnect the vessels. This drama set Alexis Carrel, as a young surgeon, to think about developing techniques to suture blood vessels. He knew that many surgeons before him had tried it, but were unable because of lacking a suitable method of uniting the blood vessels. Of course, he was also aware of the work of Matthieu Jaboulay at the same Lyon hospital, who successfully had developed experimental techniques to repair a divided carotid artery. However, this technique did not work for small blood vessels [2].

If such a technique could be realized successfully, it could help not only many patients with vascular problems but also patients of whom organs like kidney or heart were not functioning optimally anymore or were destructed otherwise, thus replacement and transplantation of organs.

Using very thin threads and extremely fine needles Carrel was able to develop well-functioning arterio-venous anastomosis in 1902. These successful techniques led in 1904 to his experimental transplantation work in dogs at the University of Chicago together with Charles Guthrie. Carrel had left France because of criticism by his colleagues for his report of the miraculous healing of a young girl nearly dying of tuberculous peritonitis in the train to Lourdes, May 1903.

With Guthrie, he performed many transplantation procedures e.g. kidney, heart, limbs, cornea, thyroid and ovary of which the results have been published in more than 20 papers between 1904 and 1906. Invited for a lecture at the John Hopkins Hospital he came in contact with the just appointed director of the newly set-up Rockefeller Institute in New York who invited him to work there which he accepted immediately.

Also here, he was confronted and hampered by protesters for his animal experimental work, but this all changed after saving the life of a very young infant who was severely bleeding, by anastomosing the left radial artery of the father to the popliteal vein of the baby. In the meantime he got also invited in the field of thoracic surgery and experimental heart transplantation at the Rockefeller Institute. Rejection of the transplants was, however, the biggest problem which brought him in the field of tissue and cell culturing and also in cancer research. Later in 1931, he received for all his work the Nordhoff-Jung Award.

Twenty months after receiving the Nobel Prize, World War I broke out and being in France at that time he became involved in the treatment of numerous wounded and infected soldiers for whom no therapy was available at that time. Together with the English chemist Henry Dakin an antiseptic solution, sodium hypochlorite was developed which saved the lives of thousands of infected persons. The Dakin-Carrel technique was successfully taught to US medical officers when he was back in the USA in 1917, the year that the USA entered the war. After the war he gave up the research in vascular surgery and went on with work on tissue culture, cancer research and preservation of organs by perfusion techniques. The latter brought him in

contact with the famous aviator, Charles A. Lindbergh who perfected a well working perfusion apparatus which might be able to replace the stopped heart during operation and might be considered as the precursor of the artificial heart [3].

At the end of the 30s Carrel became more interested in philosophy and less interested in science and surgery. He left the Rockefeller Institute at the age of 65. During a vacation in 1939, World War II broke out and he became involved again. He developed the mobile field hospital with the help of American colleagues. Being back in France his name and fame was misused by statements that he was a Nazi supporter. Shortly after the liberation of France, Alexis Carrel died of a myocardial infection in Paris on 5 November 1944 at the age of 71 years.

The life and work of Alexis Carrel is of great historical and scientific interest and also very valuable today. The statement ''From history you can learn'' is certainly true here.

The way Carrel was thinking, working and interested in many other topics outside his surgical work might be very stimulating for young people planning a career in science and/or medicine.

The innovative surgeon and visionary scientist Alexis Carrel was, is and remains the founding grandfather of organ and tissue transplantation today. He was a real genius man with many positive aspects. It might be an idea for the European Society for Organ Transplantation to install an ''Alexis Carrel visiting Professorship'' as well as an ''Alexis Carrel Lecture'' at its bi-annual congresses.

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