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Professor Paolo Zamboni in Trento

by Eleuterio Toro

Professor Paolo Zamboni visited the University of Trento on 25th October 2011 to meet a selected group of more than 20 scientists from various countries (Italy, Germany, England, Switzerland) and various disciplines (mathematics, physics, engineering, biology, medicine). The purpose of the meeting was to hear from professor Zamboni, director of the Vascular Diseases Center of the University of Ferrara, a direct account of his latest medical research on Multiple Sclerosis (MS) and his vascular theory, for which he is well-known on an international scale.

MS is the most common cause of neurological disabilities in young adults, with most cases diagnosed between 20 and 50 years of age. Europe has currently 400 thousand MS patients. MS is a disease that attacks the central nervous system (CNS), leading to progressive disability. Symptoms include changes in sensation, muscle weakness, muscle spasms, difficulty in moving, difficulties with coordination and balance, problems in speech, problems with swallowing, visual problems, fatigue, acute or chronic pain, bladder and bowel difficulties, cognitive impairment. The currently accepted model of MS defines it as an autoimmune disease, of unknown origin, for which there is no cure available to date. Professor Zamboni has recently discovered a very strong correlation between MS and anomalous venous blood flow from the brain, caused by a plethora of vessel malformations and has put forward the hypothesis that such anomalies may well contribute to triggering mechanisms for the onset of MS. Zamboni's discovery brings back the vascular model of MS, as distinct from the autoimmune model, which is currently the dominant model of MS in the scientific community.

The vascular theory of MS, whether valid or not, goes well beyond strictly medical issues, posing challenges to basic sciences, including physics, bio-fluid mechanics, applied mathematics and computational mathematics, amongst others. Useful future research on the subject will necessarily have a highly interdisciplinary character. A group of Trento academics from various departments have started to study the vascular connection to multiple sclerosis and have put together research initiatives aimed at understanding the basic mechanisms involved, from a theoretical point of view. Such theoretical studies have indeed a generic character, and as such, may well turn out to be also applicable to a wider range of bio-medical problems of current interest to society.

Professor Zamboni began the day by giving a detailed technical presentation of the past and current research on the vascular connection to MS, starting from the classical works of Charcot (1868), Putman (1937), Fog (1965), Adams (1988) and others. The three-hour lecture was interspersed with lots of technical questions from members of the working group. After a brief lunch the afternoon session started with presentations from Professor Tim Pedley (Mathematics, University of Cambridge), Professor Luca Formaggia (Mathematics, University of Milan), Professor Eleuterio Toro (Mathematics, University of Trento) and Professor Alberto

Bellin (Engineering, University of Trento). These presentations were followed by questions and discussion, finishing the one-day working meeting at 16:00 hrs.

At 16:30 hrs. Professor Zamboni gave a public seminar entitled “Pathophysiology of Human Cerebral Venous Return”. The event took place in the Aula Magna, Polo Scientifico e Tecnologico Fabio Ferrari. Professor Marco Tubino, Dean of the Faculty of Engineering, opened the meeting and welcomed the participants. Then Professor Eleuterio Toro explained the scientific context of the seminar and of other events of the week concerned with the Zamboni’s hypothesis. The audience, in addition to the expected university public, also included a substantial number of patients with MS, their relatives and friends. People from the media were also present. Professor Zamboni explained his theory in lay terms to a mixed audience, and yet retaining the rigor of scientific research. There followed a barrage of questions from the audience, mainly non-academics. It was impressive to observe in Professor Zamboni, both the rigorous scientific researcher, explaining his theory and the true medical doctor listening and talking to patients with MS. It all conveyed the message that scientific research can also have a human dimension.

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