CLINICAL HEMORHEOLOGY, Vol. 4, pp. 105-108, 1984
0271-5198/84 $3.00 + .00 Printed in the USA.

3RD EUROPEAN CONFERENCE ON CLINICAL HAEMORHEOLOGY

WELCOME ADDRESS

Holger Schmid-Schönbein
Chairman, Organizing Committee

On behalf of the organizing committee of our two congresses it is my honour and pleasure to welcome you to the opening ceremony of the 3rd European Conference on Clinical Hemorheology. I must admit a feeling of extraordinary satisfaction for having achieved to amalgamate for one day the two congresses here in Baden-Baden. As a trained physician who was led astray from the practice of medicine by the fascination of experimental biorheology I am pleased to see united in this conference hall the world wide community of experimental biorheologists and the rapidly growing community of clinical hemorheologists.
As we all know, our society started as "International Society of Hemorheology". Although it was adequate to expand into a Society for Biorheology, the last fifteen years have shown that the immense practical potential of rheological concepts were first recognized by clinical investigators and they now have their own conferences. The unforgettable meeting in Nancy, organized in a truely interdiscipilinary spirit by the team of Jean Francois Stoltz and Pierre Drouin set the pace, the momentum of their initiative sufficed for the organization of two more meetings by ad hoc committees, the one under the chairmanship of John Dormandy in London and now this one. I need an excuse as a physiologist to venture in the footsteps of Jean Francois, Pierre and John. I call to your memory that I was introduced into this field by my teacher Roe Wells, an established clinician. Later I was fortunate to work with young medical investigators who passed through my lab and continued their research in various clinical fields. Their perpetual feedback over the years has been most rewarding and inspiring. During the last two years these clinicians shaped the present scientific programme as established specialists in all medical and surgical disciplines. I am proud to mention in alphabetical order: Peter Aspelin, Lothar Heilmann, Hans Klose,Norbert

Koerber, Horst Rieger, Wilfried Tillmann and Eberhard Volger. Also, the long established cooperation in scientific matters with Professor Ulrich Gottstein, as the pioneer of German Clinical Hemorheology, with Konrad Messmer and his many students, with Albrecht Ehrly and last not least with Peter Gaehtgens, could smoothly be put to work in structuring this meeting. The actual nitty gritty of the organization of this meeting rested on the shoulders of the members of the Department of Physiology in Aachen under the direction of Mrs. Maria Brendt as the secretary of our ad hoc committee.

It was John Dormandy who set the motto for this meeting:
" i n v i v o v e r i t a s ".

It was a plea for scientific investigation of the role of hemorheological factors in the diagnostics and therapy of diseases, and that, of course, requires detailed knowledge about the physiological and pathological dynamics of the flow of blood in tissues, a very old research programme indeed! As we were taught by FAHRAEUS, the old Greeks and certainly modern medicine since the days of Harvey, Boerhaave and von Haller searched a similar for "in vivo veritas" as well. Ever since men thought about the physics of blood flow and disease, they jumped to the straightforward conclusion that it would be good to make the blood thin. The reverse logic was also applied: it is harmful to have viscous blood. It is surprising that this simple truism was almost forgotten for many decades, probably because physics and pharmacology in combination were so overwhelmingly suggestive: dilate the blood vessels and you will cure all circulatory troubles.

Starting with the introduction of low molecular weight dextran solutions by our unforgotten friend and teacher Lars-Eric Gelin, rather convincing pragmatic results were achieved by methods like hemodilution, plasmapheresis, defibrinogenation and possibly certain drugs that affect the viscosity (or shall I say the quantity that is measured in viscometers and filtrometers); they are highlighted by an improved perfusion and/or improved oxygenation of tissues, sometimes even dramatic clinical effects such as the restoration of vision and the healing of leg ulcers. However convincing these are a look into the intricacies of the many interactions that occur shows us that we cannot expect that there are simple straightforward relationships between "hyperviscosity" and disease or "rheological remedies" and cure of the disease. Physical measurements of "blood viscosity" in a macroscopic rheometer, or of "blood filtrability" in a microscopic one can be very misleading, as we will hear during this meeting. The classical concept of viscosity, successfully applied in general fluiddynamics since its introduction by the physician and physiologist POISEUILLE cannot be applied to blood as we draw it from a vein and drive it through a glass tube. Except in a few dramatic exceptions like myeloma and sickle cell disease, we will find only loose correlations between fluidity of whole blood and cardiovascular function. This has to do with the fact that more than 99.9% of microvessels are perfused with a suspension of cells in plasma that is different in composition and viscosity from the blood we take from the macrovessels.
Blood flow in microvessels is a system of unusual complexity, a

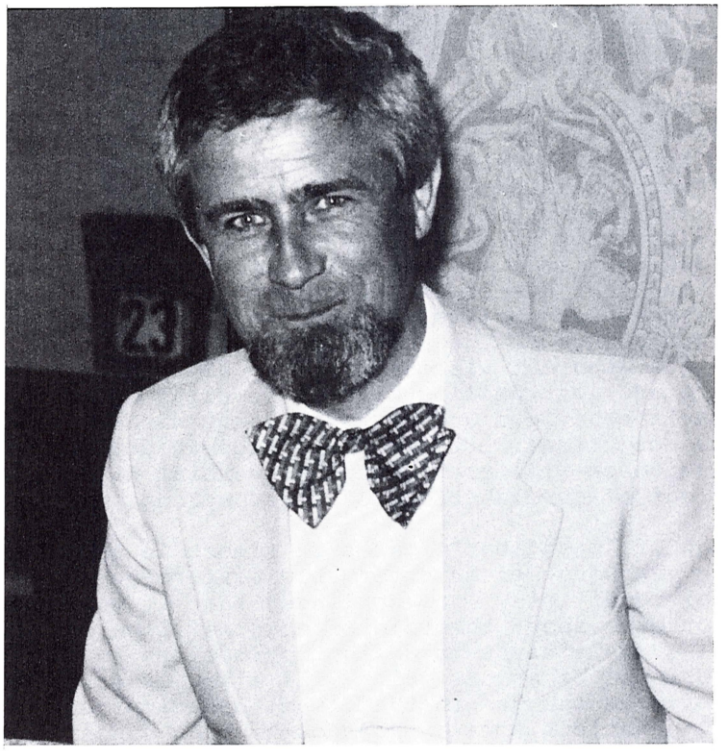
true rheological puzzle. The cells are "abnormal in their behaviour", the vessels are narrow and variable in diameter, the flow is highly irregular and the vessel content changes its composition from moment to moment. We have heard Al Copley repeat his conviction that "biorheology is the missing link in the life sciences". It is an essential supplementation of the classical bio-medical sciences, and almost by definition, more comprehensive. Unfortunately, our claim for comprehensiveness stands in a pitiful contrast to the poverty of adequate methods to observe quantitatively highly complex materials in highly complex conduits under highly complex external conditions. And, of course, we are forced into a holistic approach. Morphology and biochemistry, as the leading methodologies that carried the banner of reductionism in biological sciences, were in much simpler position. Starting with Morgagni, they managed to enbalm, fix,dissect and slice the complexities of biological systems and look at the structure of its remnants with better and better microscopes. Biochemistry thrives on the availability of biological fluids, and where they are not available, biochemists take the tissues,disintegrate them with mortars of increasing sophistication and then perform chemical tests on the tissue juice they produce. The "in vivo veritas" that John Dormandy spoke about is hidden deep in an intact and interacting, an inevitably complex micro- and macrocosmos of molecules, cells, tissues and organs and can only be grasped in experiments that do not destroy or reduce this complexity.

These complexities require research strategies that transgress the ones established in the so-called "exact sciences". For rheologists at large, for clinical hemorheologists in particular there is an additional difficulty: this has to do with a simple fact that was underlined by Scott Blair in the introduction to his "elementary rheology": in rheology with the exception of the quantum level, we are n o t measuring properties but rather processes. Scott Blair speaks of "processes", I think the term "behaviour" is more appropriate. We know today that all the established determinants of the non-Newtonian behaviour of the blood and thence its apparent viscosity can be altered in disease. However, we are not just dealing with abnormality in the flow dependency of their behaviour and last not least with an abnormality in the flow conditions. I trust that concepts derived from the behavioural sciences will provide the proverbial Ariadne's thread that leads out of our labyrinth of interactions.

When I speak of "behaviour" I mean it almost in the sense of psychology: in the sense of an observable performance under a set of experimental conditions. I am convinced that if we manage to formulate hypotheses about the rôle of abnormal flow behaviour of blood in vivo, we attempt to design appropriate in vitro experiments to test the behaviour which will allow us to correlate it to the observable changes in the global behaviour of the perfused tissues. In a patient,where we cannot hope to assess directly the flow behaviour in vivo, we can assess "useful clinical effects", of improved rheology, like an increase in tissue pO_2 and flow and try to relate it to the behaviour pattern of the blood and defined tests of vascular reactivity. This brings me to our present programme. We have made every possible effort to solicit contribu-

tions from workers in vivo. I regret that I have to inform you that two main lecturers Prof. Elisabeth Leniger-Follert and Prof. Silvio Baez will be unable to deliver their papers. I am glad to say that they are in the process of recovery from health problems that prevented them from coming.

Ladies and Gentlemen, the rapid growth of the idea of clinical hemorheology in all European countries reflects itself in the establishment of national societies which keep close contact in the recently founded European Clinical Hemorheology Co-Ordinating Committee (ECHCC). These national societies will have to take over in the future. I am thoroughly optimistic that those individuals who have extemporated unofficially in ad hoc committees in the past, will tackle these problems as they have now closed the ranks for the future official organization of our science. I close in extending my best wishes for the success of future conferences on clinical hemorheology in Europe (where this science now flourishes) and elsewhere around the world.



Conference Chairman: Holger Schmid-Schönbein