

INVITED CONTRIBUTION

ROBIN FÅHRÆUS (1888-1968)

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Robin Fåhræus was born on 15 October 1888 in Stockholm, the son of Klas Fåhræus, a well known author, art critic and collector, and Olga Björkegren, the most prominent Swedish dramatic actress of her time. The 17th century family name is derived from Fårö, an island in the Baltic, north of Gothland. Fåhræus grew up in a highly cultured environment, the family home being a literary and artistic center in Stockholm at the turn of the century. The specially designed mansion, situated on the top of a hill in the suburb of Lidingö, overlooked the sea route to the capital.

In 1907 Fåhræus began his medical studies at the Karolinska Institute (the Medical School of Stockholm). About Christmas 1915, Fåhræus made his first fundamental observation during his obstetric training at the Southern Maternity Hospital of Stockholm. He was curious to see whether the blood of a pregnant woman differed from that of a non-pregnant woman. There were several reasons behind the question, not least the current ideas of hormonal control of body functions, first advocated by Star-

ling in 1905. The initiation of the uterine contractions at the onset of labor could be due to such a circulating factor, and, if identified, might be used as a pregnancy test. Fåhræus was also concerned with the problem of toxemia of pregnancy or eclampsia, a feared and severe complication in those days when prophylactic maternity care was less developed. He noticed that it was not necessary to label the samples of citrated blood, because soon there was a visible layer of clear plasma on top of the erythrocytes in blood from pregnant women. Fåhræus further demonstrated the occurrence of this phenomenon in a wide spectrum of different diseases, and that the aggregation of erythrocytes, which was its basis, also took place reversibly in vivo (1).

The results of these studies led to Fåhræus' doctoral thesis 'The suspension stability of the blood', presented in 1921 (2,3). In this classic work, which was published from the Department of Chemistry of the Karolinska Institute, Fåhræus showed that the increase in the amount of fibrinogen and/or serum globulin is the most important cause of the reduced suspension stability and aggregation of erythrocytes into rouleaux, clinically manifested as an increased sedimentation rate. One year later Fåhræus became 'Docent' in Experimental Pathology in Stockholm. In 1924 he went to the Department of Physical Chemistry in Uppsala to assist The Svedberg in studies on proteins using the newly constructed optic ultracentrifuge. Following a suggestion by Fåhræus the first successful attempts to determine the definite weight of a protein molecule were performed on hemoglobin (4). The results of this pioneering investigation, a milestone in the development of molecular biology, was published in 1926 (13). In the same year Svedberg was awarded the Nobel Prize in Chemistry and Fåhræus was appointed 'laborator' (Assistant Professor) in Pathological Anatomy at the Karolinska Institute.

In 1928 Fåhræus received the Chair of Pathological Anatomy of the University of Uppsala. Together with Torsten Lindqvist, a young unpaid, technically skilled assistant (later Honorary Professor of Medicine in Gothenburg), he made the fundamental dis-

covery which greatly advanced the new discipline of biomedical research, viz., hemorheology, a field of biorheology. In model experiments using glass capillaries of very small diameter, they found that, paradoxically, the relative viscosity of the blood, and thus the resistance to flow, decreased when the diameter of the vessel was reduced from 0.3 mm to capillary size (10). This effect of the vessel diameter is known as the Fåhræus-Lindqvist phenomenon. Lindqvist (12) has mentioned an incident, which reflects Fåhræus' attitude towards research. Late one evening, Fåhræus came to the laboratory, as was his habit, and Lindqvist expressed his disappointment that he had not gotten the expected results. 'Are you sorry for that?' remarked Fåhræus. 'When you get an unexpected result you should be damned glad. If you only get the result you had expected, you have no hope of discovering anything new'.

Fåhræus was a highly esteemed vice chancellor ('prorektor') of his Alma Mater from 1952-55 and President of the Royal Swedish Academy of Science from 1945-46. He became Emeritus Professor in 1955, but continued to do research along his favorite lines almost to the end of his life. Among other subjects he studied the function of the spleen (9), the dependence of the rhythmic glycogen storage of the liver on the microcirculation (5), the pathogenesis of circulatory shock (7) and eclampsia (8). Fåhræus' scientific work was characterized by a remarkable capacity for making fundamental observations, using simple equipment handled with great skill.

Throughout his life Fåhræus showed a keen interest in the history of medicine. One-third of his doctoral thesis was devoted to a historical review of the subject, starting from antiquity (2). Since the dawn of history, one of the most commonly employed therapeutic measures, with all its disastrous consequences, was the practice of blood-letting. Fåhræus was convinced that this form of treatment was based on false interpretation of real observations of a layer of fibrin, called 'phlegm' or 'crusta inflammatoria', separating in the venesected, coagu-

lated blood, secured from patients and from pregnant women. Late in his life, Fåhræus realized that already in the 17th and the 18th century the Dutch investigators van Leeuwenhoek and Boerhaave had observed erythrocyte aggregation experimentally. Boerhaave was able to see this phenomenon in conjunctival vessels of living healthy as well as diseased individuals (6). Fåhræus' 'History of Medicine', published in Swedish (4) and translated into Spanish, is written in a captivating and exciting style. His vivid language reflects his artistic temperament, influenced by his upbringing. This is also manifested in his many paintings. They include landscapes from the West Coast of Sweden, where he spent his summer vacations, and several self-portraits.

Fåhræus initiated the restoration of the State Hall of the Renaissance Castle in Uppsala, frequently used for academic celebrations. He also participated in the reconstruction of the 17th century Anatomical Theater of Olaus Rudbeck, one of the very few amphitheatres of its kind to survive in Europe.

Fåhræus was an enthusiastic lecturer who carried his listeners along with him. As a popular orator, he was cherished by many generations of students and colleagues. He felt a strong affinity for Claude Bernard and, in his study, Fåhræus kept a copy of L'hermitte's famous painting of Bernard lecturing in his laboratory at the Collège de France. The words which Fåhræus used to characterize Bernard could be applied equally to himself: 'Though he did not lack understanding of the surveyors' and cartographer's task of improving and perfecting in detail the maps of those areas, of which we already possess some knowledge, he himself was only attracted by the endless vistas of the unknown continent behind this coastal strip, and it was this which caused his heart to be restless.'

Fåhræus died on 20 September 1968. He and his beloved wife are buried in the ancient cemetery of Uppsala. There, the memorial cross bears in its center a metallic figure, representing a glass tube for blood sedimentation. At sunset, a beam of light

is reflected from the meniscus of this symbolic figure, reminding the receptive visitor of one of the great personalities of the oldest University of Sweden.

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