

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/225052312>

A short history of the discovery of the erythrocyte sedimentation rate

Article in *International journal of laboratory hematology* · May 2012

DOI: 10.1111/j.1751-553X.2012.01430.x · Source: PubMed

CITATIONS

7

READS

487

2 authors:



Andrzej Grzybowski

University of Warmia and Mazury in Olsztyn

646 PUBLICATIONS 2,259 CITATIONS

[SEE PROFILE](#)



Jaroslaw Sak

Medical University of Lublin

85 PUBLICATIONS 275 CITATIONS

[SEE PROFILE](#)

Some of the authors of this publication are also working on these related projects:



Maps of Healthcare Needs in Poland [View project](#)



History of medical ideas [View project](#)



Letter to the Editor

A short history of the discovery of the erythrocyte sedimentation rate

Sir,

We have read with great interest an article titled 'ICSH review of the measurement of the erythrocyte sedimentation rate' [1] which focused on the development of standardization of ESR. Unfortunately, the article contains incomplete information about the discovery of the erythrocyte sedimentation rate and its first application in medical diagnosis.

The first scientist, who explained through experiments the pathophysiological basis of ESR and used it for the first time in clinical diagnostics, was a Polish physician



Figure 1. Edmund Biernacki (1866–1911).

Edmund Biernacki (1866–1911) [2–5]. The explanation of the essence of ESR provided by Biernacki (Figure 1) was based on proving the connection between the speed of sedimentation and the amount of fibrinogen in the blood [3, 4]. The first report on the ESR, without the assessment of its usefulness in clinical diagnostics, was presented in 1894 in 'Wiener Medicinische Wochenschrift' [2]. The discovery of the diagnostic usefulness of ESR and the pathophysiological explanation of the phenomenon was announced in 1897 in two articles simultaneously: one written in Polish and published in 'Gazeta Lekarska' [3] and the second in German and published in 'Deutsche Medizinische Wochenschrift' [4]. Few months before the publications describing the application of ESR in diagnostics, on June 22, 1897, Biernacki presented, before the Warsaw Medical Society, five most important conclusions from his observations [5]. These conclusions were as follows: blood sedimentation rate and volume of residue produced are different in different individuals; blood with small amounts of blood cells sediments faster; blood sedimentation rate depends on the level of 'fibrinogens' in the blood plasma. During the course of febrile diseases (rheumatic fever included) with large amounts of plasma fibrinogen, the ESR is increased, and in the defibrinated blood, the sedimentation process is slower. Conclusions presented by Biernacki suggested clinical usefulness of the discovery of ESR. They indicated a sedimentational importance of plasma fibrinogen found in increased quantities in febrile diseases. Biernacki designed a 20-mm-high glass cylinder to conduct repetitive assays of ESR. The first cylinders of this type were produced in C. Gerhard's Company in Bonn (Figure 2). The volume of blood subjected to sedimentation in such a cylinder was 1 cm³. Biernacki measured ESR at three time periods: after half an hour, after an hour, and after 24 h. He underlined that the clinical usefulness of ESR is determined mostly by the measurement taken after an hour. As an anticoagulant, he used powdered sodium oxalate (0.0002 g on 1 cm³ of blood) [3, 4]. In 1906, Biernacki modified previously developed technique of a laboratory measuring of ESR, and instead of the originally used 20-mm-high cylinder, he used a capillary pipette of his own design called a 'microsedimentator' [5]. This

Fig. 107.



Halbschematische
Abbildung des Sedi-
mentierungsgefäßes.
Natürliche Grösse.

Figure 2. The glass cylinder designed by E. Biernacki and made by C. Gerhardt Company (Bonn, Germany) for measurement of ESR (Reprinted from [4]).

technique allowed measurement of ESR after drawing a small amount of blood from the tip of the finger.

Extremely interesting is the fact those twenty years after Biernacki's publications on ESR, three scientists made similar 'discoveries'. Independent of each other and at least initially not aware of the details of Biernacki's works, reports on the 'discoveries' were presented by:

Ludwik Hirszfild (1884–1954), Robert Sanno Fåhraeus (1888–1968), and Alf Vilhelm Albertsson Westergren (1891–1968). First, in 1917 – 6 years after Biernacki's death, this discovery was presented by a Polish physician of Jewish origins – Hirszfild [6], who gained worldwide fame for research on blood groups and Rh factor. He observed the phenomenon of ESR in blood taken from patients with malaria. These observations were carried out during an outbreak of malaria epidemic in Serbia in 1916 [5, 6]. A year after Hirszfild's report, another 'discovery' of ESR was made by a Swedish hematologist Robert Sanno Fåhraeus [7]. Three years later, he extensively discussed them in 'Acta Medica Scandinavica' [8]. Fåhraeus saw the possibility of using ESR as pregnancy tests. Based on observations of sedimentation of blood obtained from patients with pulmonary tuberculosis, a Swedish internist Alf Vilhelm Albertsson Westergren (1891–1968) presented a similar description of ESR [9] as that provided earlier by Biernacki, Hirszfild and Fåhraeus. Westergren applied the blood-drawing method for the ESR test using trisodium citrate dihydrate as a coagulant. This method was later recommended by the International Council for Standardization of Hematology (ICSH). Westergren also defined standards for the ESR test. Biernacki's and Hirszfild's works concerning ESR are also omitted in the ICSH recommendations, while the works of Fåhraeus and Westergren from 1921 are included.

On the hundredth anniversary of Biernacki's death, which falls on 2011, it is worth to remember the essential input made by him in the development of the ESR diagnostics [5]. This is required by the necessity of having reliable scientific discussions.

A. Grzybowski*, J. Sak[†]

*Department of Ophthalmology,
Poznań City Hospital, Poland

[†]Department of Ethics and
Human Philosophy,
Medical University of Lublin, Poland
E-mail: ae.grzybowski@gmail.com

doi: 10.1111/j.1751-553X.2012.01430.x

References

1. Jou JM, Lewis SM, Briggs C, Lee SH, De La Salle B, McFadden S. ICSH review of the measurement of the erythrocyte sedimentation rate. *Int J Lab Hematol* 2011;33:125–32.
2. Biernacki E. Blutkörperchen und Plasma in ihren gegenseitigen Beziehungen. *Wiener Medicinische Wochenschrift* 1894;36:37.
3. Biernacki E. Samoistna sedymentacja krwi jako naukowa i praktyczno-kliniczna metoda badania [Spontaneous blood sedimentation as a method for scientific and clinical investigation]. *Gazeta Lekarska* 1897a;17, 962–8, 996–1004.
4. Biernacki E. Die spontane Blutsedimentierung als eine wissenschaftliche praktisch-klini-

- sche untersuchungsmethode. Dtsch Med Wschr 1897b;23:769–72.
5. Grzybowski A., Sak J. Edmund Biernacki (1866–1911): discoverer of the erythrocyte sedimentation rate. On the 100th anniversary of his death. Clin Dermatol 2011;29:697–703.
 6. Hirszfeld L. Über ein neues Blutsymptom bei Malaria-krankheit. Correspondenz-Blatt für Schweizer Ärzte 1917;47:1007–12.
 7. Fåhræus R. Über die Ursachen der verminderten Suspensionsstabilität der Blutkörperchen während der Schwangerschaft. Biochem Z 1918;89:355–64.
 8. Fåhræus R. The suspension-stability of the blood. Acta Med Scand 1921;55:1–228.
 9. Westergren A. Studies of the suspension stability of the blood in pulmonary tuberculosis. Acta Med Scand 1921;54:247–82.