Unjustly forgotten scientist Waclaw Mayzel (1847–1916)—co-discoverer of somatic mitosis

Janusz Limon1 · Ewa Bartnik2 · Janusz Komender3

Received: 17 May 2021 / Revised: 17 May 2021 / Accepted: 1 June 2021 / Published online: 17 June 2021
© The Author(s) 2021, corrected publication 2024

Abstract
Descriptions of somatic cell divisions were made as early as the eighteenth and nineteenth centuries with varying degrees of accuracy. In this paper, we would like to present a forgotten Polish scientist Waclaw Mayzel (1847–1916), who described somatic mitosis in the corneal epithelium of the frog in 1875 almost simultaneously with the recognized discoveries of animal mitosis by Otto Bütschli and plant mitosis by Eduard Strasburger.

Keywords Animal mitosis · Somatic cell divisions · Somatic mitosis

Descriptions of cell divisions were made as early as the eighteenth and nineteenth centuries with varying degrees of accuracy. We would like to present a forgotten Polish scientist, Waclaw Mayzel, who described somatic mitosis in the corneal epithelium of the frog almost simultaneously with the recognized discoveries of animal mitosis by Otto Bütschli and plant mitosis by Eduard Strasburger.

Waclaw Mayzel MD, PhD (Fig. 1) was born in Kunów (Ostrowiec County, Poland) on September 12, 1847. Father Joseph and mother nee Minheymer. Mayzel graduated in 1865 from St. Anna grammar school in Cracow and began to study at the School of Medicine of Warsaw University. Still as a student, Mayzel began to work in the Department of Physiology and Histology headed by Henryk Fryderyk Hoyer Senior. In 1870, he received a diploma cum eximia laude and got an assistant position in Hoyer’s Department. After 15 years of academic and research work, he was forced by Russian authorities to leave the University. The conditions of Polish scientists in the second half of the nineteenth century were complicated by the Russian invaders. In general, Russian authorities did not favor the development of science by Polish researchers. For these reasons, several talented Polish scientists decided to leave Poland and, for example, Eduard Strasburger (from a Polish family of German origin from the eighteenth century), a colleague of Mayzel from Warsaw University, took a chairman position in the Botanic Chair in the University of Jena and left Warsaw in 1869 (Hryniewiecki 1938; Korohoda 2012). Waclaw Mayzel decided to stay in Warsaw and devoted his time to laboratory diagnostics analyses. He died on April 19, 1916.

The main topic of Mayzel’s research was corneal epithelium regeneration in frogs, rabbits, cats, and frog skin. He had observed that nuclei of newly formed cells after division displayed novel structures related to the nucleus. Many researchers at the time believed that cell division involved the “dissolution” of the nucleus with subsequent reassembly of its structure. Bütschli (1875) was the first to identify and order sequentially the stages of nuclear division in several types of animal cells, simultaneously with Mayzel who looked at corneal epithelium mitosis (1875a, 1875b, 1878) and Strasburger’s work (1875; 1876) on the division of plant cells prior to Flemming’s studies on animal cell division who introduced the term mitosis (Flemming, 1878). In addition, Bütschli demonstrated that the polar bodies of eggs arise through atypical cell division (Bütschli 1875).

At two meetings of the Warsaw Medical Society held on April 7 and 21, 1874, Mayzel presented the results of his research on epithelium regeneration and its behavior during transplantation. He repeatedly noted numerous coarse grains and filamentous formations in the nuclei of newly formed cells. He concluded that he had found traces of “hitherto...
unknown details” in his observations and therefore submitted a description of them to the Warsaw Medical Society in a sealed envelope in order to ensure that they would be hidden to ensure his priority in the case of confirmation of these (Mayzel, 1875c; Ostrowska 1975). Shortly afterwards, in 1875, the botanist E. Strasburger [1875] and the zoologist O. Bütschli (1875) published papers in which they linked cell division with the cell nucleus. This “emboldened” Mayzel to send to publish the first descriptions of his observations of mitosis (1875a; 1875b). In March 1876, Mayzel showed his preparations to E. Strasburger, who fully confirmed the great similarity between plant and animal mitoses (Mayzel 1876). In 1884, the memorial book of Prof. H. Hoyer with drawings of animal mitosis made by Mayzel was published (Mayzel 1884) (Fig. 2).

Mayzel’s pioneering publication received much attention from many researchers abroad. Many authors confirmed his observations and found several similarities with their findings and widely discussed the presence of several structures in the nucleus and described the process of division of these cells (von Waldeyer, 1876 and 1888; Strasburger 1876; Arnold 1879a; 1879b; Schlecher 1879).

In 1888, W. Waldeyer who introduced the term chromosomes stated “I have had the possibility to see the clearest spindles in animal cells recently in the very beautiful preparation of Mayzel” (Waldeyer 1888). Mayzel won the praise of many authors who have quoted portions of the text of his articles and showed his original drawings of mitosis and his methodological protocols. Mayzel extended his research to the tail tissues of triton larvae, salamanders, perch embryos, rabbit, and bird corneas, by observing similar mitotic division figures as in the frog corneal epithelium (Mayzel 1875a; 1875b; 1877). He presented the results of his research at medical congresses in Krakow (1881), Berlin (1881 and 1890), Prague (1882), Paris, London, Rome, and Madrid.

In the history of scientific discovery, the date of publication is critical so it is important to note that the first descriptions of newly discovered karyokinesis were published in 1875 almost simultaneously by Bütschli (May), Strasburger (May), Mayzel (November), and E. v. Beneden (December). Undoubtedly, the input by Mayzel was great and he should be cited like Bütschli (1875) and Strasburger (1876). Later on, Mayzel’s name almost disappeared among the discoverers of mitosis. Much of the blame falls on the Polish...
histologist W. Szymonowicz, author of the large textbook on histology (1901 first edition) that has had many editions (XII) in five languages. In his textbook in the Polish edition (1924), he lists 15 researchers who deserved the most credit for the explanation of mitosis and does not mention Mayzel’s achievement (Wozniewski 1949; Szumowski 1952). It is hard to believe that the omission of his publication was accidental.

In 1916, Professor A. Sokolowski, secretary of the Warsaw Medical Society, wrote: “He left this world... almost completely forgotten, a great Polish scientist, who in different conditions, in a different society, would have been the glory and the ornament of universities and academies…” (Wozniewski 1949).

On the 100th anniversary of the description of mitosis, the Warsaw Medical University issued a bibliophilic print containing the publication of Waclaw Mayzel from 1875b. In 1998, the Medical Faculty of the Polish Academy of Sciences decided to award medical students for their scientific achievements with the “Dr. Waclaw Mayzel Medical Laurel.”

Acknowledgements Professor Tomasz Jasinski, Polish Academy of Sciences Kornicka Library, Kornik, Poland, for making available the memorial book of Prof. H. Hoyer with drawings of animal mitosis made by Waclaw Mayzel (Mayzel 1884). Professor Włodzimierz Korohoda, Polish Academy of Art and Science, for making available the book in Polish and German of the life of Eduard Strasburger (Hryniewiecki 1938). Małgorzata Gorczewska, M. Sci. Main Library of the Gdańsk Medical University, Poland, for help in finding articles and books from the 19th century. Agnieszka Wozniak, Ph.D. from Leuven University for providing the Benden Van E monography.

Author contributions The authors contributed equally to this work.

Data availability Not applicable.

Code availability Not applicable.

Declarations

Ethics approval This is a historical study. Ethics approval is not applicable.

Consent to participate This is not applicable.

Consent for publication This is not applicable.

Conflict of interest The authors declare no competing interests.

Open Access This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article’s Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article’s Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit http://creativecommons.org/licenses/by/4.0/.

References

Arnold J (1879a) Beobachtungen über Kerntheilungen in den der Geschwülste. Archiv Für Pathologische Anatomie Und Physiologie Und Für Klinische Medicin 78:279–301

Arnold J (1879b) Ueber feinere Struktur der Zellen unter normalen und pathologischen Bedingungen. Archiv Für Pathologische Anatomie Und Physiologie Und Für Klinische Medicin 77:181–206

Benden Van E (1875) Multiplication des Cellules, Chapitre VI, 728–736 In: La maturation de l’œuf, la fécondation, et les premières phases du développement embryonnaire des mammifères, d’après des recherches faites chez le lapin : communication préliminaire inBulletins de l’Académie royale de Belgique. 2me.série 40(12)

Bütschi O (1875) Vorläufige Mittheilung einiger Resultate von Studien über die Conjugation der Infusorien und die Zelltheilung. Zeitschrift Für Wissenschaftliche Zoologie 25:426–441

Flemming W (1877) Beiträge zur Kenntnis der Zelle und ihrer Lebenserscheinungen. Arch Für Mikroskopische Anatomie 16:302–436

Hryniewiecki B (1938) Prof. dr. Edward Strasburger (1844–1912). Jego życie i dziela (Polish): 1–101. Abstract in German Prof Dr Eduard Strassburger (1844–1912) Sein Leben and Seine Werke: 82–97. Biblioteka Botaniczna Wydawnictwo Polskiego Towarzystwa Botanicznego Skład Główny w Kasie im. J. Mianowskiego, Warszawa

Korohoda W (2012) Edward Strasburger (1844–1912) W stuleciu śmierci wielkiego uczonego przyrodnika. (Polish) www.pauza.krakow.pl 165/66: 8–9

Mayzel W (1875a) Ueber eingenthümliche Vorgänge bei der Theilung der Kerne in Epithelialzellen. Centralbl f.d. medic. Wissensch 50:849–852

Mayzel W (1875b) Epithelium regeneration. Reports of Meetings of the Medical Societies. The Warsaw Medical Society Meetings of 7 and 21 April 1874. (Polish): 317–329

Mayzel W (1875c) O szczególnych zjawiskach przy dzieleniu się jąder w komórkach nabłonkowych. (Polish) MEDYCyna 45 705–708

Mayzel W (1876) Przyczynke do sprawy dzielenia się jąder komórkowych. (Polish) Gaz Lek t 21, 27: 420–426

Mayzel W (1877) Dalszy przyczynke do sprawy dzielenia się jąder komórkowych. (Polish) Gaz Lek t 22, 26 429–432

Mayzel W (1878) O regeneracyi epitelia i dielenii jader. (Russian). Raboty łaborat. Med fakultat Imperial Warsz Uniwersiteta, Wypusk 4 Warszawa Czast I 1–127

Mayzel W (1884) O Karyomitozie, Księga pamiętkowa prof. Henryka Ferdynanda Hoyera. (Polish) Festschrift zu Ehren Hoyers’, Warszawa S 531–575

Ostrowska T Polski Słownik Biograficzny (1975) Mayzel Wacław (1847–1916). (Polish) XX: 285–86 Zakład Naro- dòngowy Imienia Ossolińskich Polskiej Akademii Nauk, Wrocław-Warszawa-Krakow-Gdańsk

Strasburger E (1875a) Ueber Zellbildung und Zelltheilung. 2 Aufl Jena Dabis

Szumowski W (1952) Wacław Mayzel i odkrycie kariokinezy. (Polish) Polski Słownik Biograficzny (1975) Mayzel W (1875a) O regeneracyi epitelia i dielenii jader. (Russian). Raboty łaborat. Med fakultat Imperial Warsz Uniwersiteta, Wypusk 4 Warszawa Czast I 1–127

Strasburger E (1875b) Ueber Zellbildung und Zelltheilung. 2 Aufl Jena Dabis

Schleicher W (1879) Die Konorpelzelltheilung. Arch Für Mikroskopische Anatomie 16:248–368

Szymowiski W (1952) Waclaw Mayzel i odkrycie kariokinezy. (Polish) Polish Academy of Art and Science Reports of activities of meetings January-December 1951: 47–48
von Waldeyer W (1888) Ueber Karyokinese und ihre Beziehungen zu den Befruchtungsvorgangen. Arch F Mikrosk Anat 16:1–122
Waldeyer von W (1876) Histologie Jahresbericht über die Leistungen and Fortschritte in der Gesammten Medicin. Bericht für das Jahr 1875. Ed. Rud. Virchow und Aug. Hirsch, Berlin, Verlag von August Hirschwald: 22–124
Wozniewski Z (1949) Waclaw Mayzel zapoznany histolog polski. (Polish) Pol Tyg Lek 6: 188–191

Publisher’s Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.