

Rudolf Virchow: 200th birth anniversary

Rosa Henriques de Gouveia^{1,2,3}  · Jacek Gulczynski⁴ · Vincenzo Canzonieri^{5,6} · Gabriella Nesi⁷ · on behalf of the History of Pathology Working Group of the European Society of Pathology

Accepted: 8 December 2021

Rudolf Ludwig Karl Virchow was born in October 13, 1821, in Schivelbein, Pomerania, Prussia (today Swidwin, Poland); married Ferdinand Rosalie Mayer; had 6 children; passed away in September 5, 1902, in Berlin, Prussia (Germany); and caused meritorious rivers of ink to flow around the world, throughout the years to the present times, due to his lifelong accomplishments [1, 2].

The only child of Carl Christian Siegfried Virchow and Johanna Maria Hesse Virchow, soon showed to be an outstanding student, fluent in many languages (German, Latin, Greek, Hebrew, English, Arabic, French, Italian, Dutch), he ended the gymnasium in Köslin (today Koszalin, Poland) in 1839, with the thesis “A Life Full of Work and Toil Is Not a Burden but a Benediction.” He received a scholarship for gifted children, to study Medicine and Chemistry at the Prussian Military Academy, in Berlin, from 1839 to 1843, ending with the thesis “De rheumate praesertim cornea.” After graduation, Virchow became assistant to his mentor Johannes Peter Müller. Soon after, he was admitted at Berlin Charité Hospital, where, from 1844 to 1848, he assisted the Prosector Robert Froriep, from whom he learned Pathology,

in general, and Microscopy, in particular. He also came in close contact with foreign scientific ideas and methodologies from France and England. In 1848, Virchow became Lecturer and succeeded Froriep. He was also asked to investigate a typhus epidemic, writing the “Report on the Typhus Outbreak of Upper Silesia.” In fact, at the time, he was actively involved at the 1848 revolution. In 1849, he accepted the Pathological Anatomy chair at Würzburg University. In 1856, Virchow was invited to return to Berlin Charité Hospital, where he became Director and stayed for 20 years — working, teaching, investigating, and writing. He is author of more than 2000 scientific publications, namely, “Vorlesungen über Cellularpathologie in ihrer Begründung auf physiologischer und pathologischer Gewebelehre” (edited in 1859). He was Lecturer in foreign countries. In 1873, Virchow was elected to the Prussian Academy of Sciences [1–3].

Virchow’s political path included memberships of the Municipal Council of Berlin (1859), Prussian Diet (1862), Reichstag (1893), and leader of the Progressive party (1862) [1–3].

A man of multi-interests and tasks, as physician, pathologist, medical museum promotor, scientist, medical historian, anthropologist, ethnologist, archaeologist, forensic investigator, professor, social reformist, and statesman, opened the door to new concepts and methodologies. In 2021, on Virchow’s birth anniversary, a retrospective observation shows how unquestionably updated his input was, as presented by the following examples [1–9]:

- Morbid Pathology still uses “Virchow Technique” in the performance of autopsies.
- Orderly collection of rare or pathognomonic necropsic or surgical specimens in Museological archives constitute an up-to-date teaching tool for pre- and post-graduate medical education and training, as defended by Virchow, within the line of *Berliner Medizinhistorisches Museum*, founded in 1899 at the Charité University of Berlin and gathering more than 23,000 specimens by his death.

✉ Rosa Henriques de Gouveia
rhgouveia@mail.telepac.pt

¹ Histology and Pathology, Faculty of Life Sciences, University of Madeira (UMa) & Clinical and Anatomical Pathology Laboratory (LANA), Funchal, Madeira, Portugal

² Anatomical and Molecular Pathology Institute (IAP-PM) – FMUC, Coimbra, Portugal

³ Pathology – CHLO, Lisboa, Portugal

⁴ Department of Pathology and Neuropathology, Medical University of Gdańsk, Gdańsk, Poland

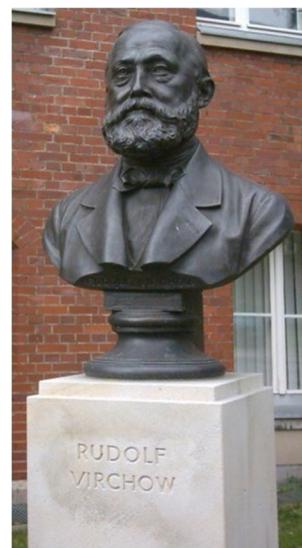
⁵ Pathology Unit, Centro Di Riferimento Oncologico Di Aviano (CRO Aviano), IRCCS, National Cancer Institute, Aviano, Italy

⁶ Department of Medical, Surgical and Health Sciences, University of Trieste, Trieste, Italy

⁷ Division of Pathological Anatomy, Department of Health Sciences, University of Florence, Florence, Italy

- An accurate macroscopic description of pathological tissues/organs, both during autopsy or while examining a surgical specimen, is of paramount importance, to recognize already known nosologic entities or to characterize new ones, as occurred during Virchow's routine work in Pathology, thus allowing his multiple discoveries, as for example “Ochronosis.”
- Then as now, a close clinic-pathological correlation is basilar for adequate diagnosis of diseases and therapeutic proposals, as documented by the liaison of enlarged left supraclavicular lymph node and gastrointestinal (namely gastric) neoplasia, the so-called “Virchow's Node,” or the studies done by Virchow on venous thrombosis and embolus, which acted as a springboard for the understanding of the later named “Virchow's Triad.”
- Microscopic examination of pathological specimens was developed and emphasized, as the ex-libris to discover the final cause(s) of disease. Virchow encouraged the students to “think microscopically.” In fact, Histopathology evolution favored the conception of “Virchow's Cell Theory (*Omnis cellula e cellula*)” and of “Virchow's Cancer Theory.”
- Virchow's concern for gross, microscopic, or chemical evaluation of the effect of drugs in tissues reminds us of the current mandatory pharmacovigilance, toxicological analysis, and anatomo-pathological evaluation of morphological lesions due to therapeutic agents, in order to monitor medical workflows.
- The value attributed by Virchow to experiments in animals for the progression of Medicine and Pathology may be seen as a precursor of the present “Experimental Pathology.”
- The advocated study of Hair in settings of homicide suspicion reveals the inquisitive Forensic mind of Virchow.
- Anthropological, archaeological, and ethnological investigations performed by Virchow, inland and abroad, namely, in Egypt, led to information towards populational affinity and other related issues. Furthermore, in 1869, he founded a Society for Anthropology, Ethnology, and Prehistory (*Gesellschaft für Anthropologie, Ethnologie, und Urgeschichte*).
- The close, *in loco*, investigation of a *Typhus* epidemic in Upper Silesia gave Virchow the insight to propose and promote Hygienic, Public Health, and Medical guidelines and to advocate Social, Humanitarian, and Educational reforms, which generated controversy and opposition at the time. Nowadays, living in COVID-19 Pandemic era, scientists, health professionals, and rulers are aware to understand the global range of such intemporal and imperative preventive actions that guarantee the well-being of populations.

Fig. 1 A sculpture of *Rudolf Virchow* (1882). Work of *Bernhard Afinger*, standing in front of the Pathology Institute at *Charité Hospital*, Berlin, Germany



He was awarded several distinctions, like Copley Medal (1892), Helmholtz Medal (1898), and Cothenius Medal (1902), among others, namely, honorary titles.

Lectures were named, speeches were done, articles and books were written, stamps were printed, paintings were drawn, caricatures were sketched, sculptures were modeled (Fig. 1), and medals were coined, to pay him tribute. The *German Society of Pathology* [of which he was co-initiator and co-founder in 1897, even suggesting the name “*Gesellschaft für Pathologische Anatomie und Physiologie*”] [10] paid him homage by creating “*Rudolf Virchow Medal*” as its highest distinction. Yet, his recognition went beyond the earth; since in 1979, a moon crater was christened “*Virchow Crater*,” with *International Astronomical Union (IAU)* approval [11].

Rudolf Virchow personifies transversal, interdisciplinary, and universal knowledge. His contributions were innovative and important at the nineteenth century and keep their relevance 200 years later. It is an honor to have such a brilliant mind and grand figure as a *Pathologist* and co-founder (in 1847) [1] of *Virchows Archives*.

Author contribution Draft of the article — Rosa H. Gouveia; critical revision — V. Canzonieri, J. Gukczynski, G. Nesi.

Declarations

Conflict of interest The authors declare no competing interests.

References

1. Canzonieri V, Italia F (2017) Virchow, Rudolf (1821–1902). In: van den Tweel JG (ed) Pioneers in pathology. Encyclopedia of

- Pathology. Springer, Cham. https://doi.org/10.1007/978-3-319-41995-4_605
- 2. Carvajal JR, Zuluaga JMR (2021) Rudolf Virchow: requiem for a visionary. *Curr Inv Cln Med Res* 1(1):1–5
 - 3. Hajdu SI (2005) A note from history; Rudolf Virchow, pathologist, armed revolutionist, politician, and anthropologist. *Ann Clin Lab Sci* 35(2):203–205
 - 4. Sasidharam A, Al-Kandary NM (2019) A review of the techniques and guidelines in adult autopsies. *Saudi J Med* 4(12):774–790
 - 5. Biography of Rudolf Virchow – Berliner Medizinhistorisches Museum EN. <https://www.bmm-charite.de/biography-of-rudolf-virchow.html>
 - 6. Titford M (2010) Rudolf Virchow: cellular pathologist. *LabMedicine* 41(5):311–312
 - 7. Buja ML (2021) The cell theory and cellular pathology: discovery, refinements and applications fundamental to advances in biology and medicine. *Exp Mol Pathol* 121(1–11):104660
 - 8. Oien CT (2009) Forensic hair comparison: background information and interpretation. FBI Review Article. *Forensic Sci Commun* 11(2):1–14. https://archives.fbi.gov/archives/about-us/lab/forensic-science-communications/fsc/april2009/review/2009_04_review02.htm
 - 9. Masic I (2019) The most influential scientists in the development of public health: Rudolf Ludwig Virchow (1821–1902). *Mater Sociomed* 31(2):151–152
 - 10. Dohm G (1997) 100 Jahre Deutsche Gesellschaft für Pathologie (1897–1997). *Pathologe* 18:S1–S17
 - 11. Virchow on Moon. Gazetteer of planetary nomenclature. International Astronomical Union (IAU) Working Group for Planetary System Nomenclature (WGPSN). <https://planetarynames.wr.usgs.gov/Feature/6399>

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