

Johann Purkinje: pioneering Czech histologist and physiologist

Johann (or Jan) Evangelista Purkinje, an outstanding pioneer in histological anatomy and neurophysiology, is best remembered today by the eponymous term 'Purkinje cell', with its characteristic large nucleus and many branching dendrites, which is found in the cerebellum. This year marks the 150th anniversary of his death, in 1869.

Purkinje was born in 1787 in the town of Libochovice, in Bohemia, Austro-Hungary, now in the Czech Republic. His parents were peasants. After a short period as a priest, he entered the Charles University in Prague as a medical student and graduated in medicine in 1818. After qualification, he was appointed assistant in the surgical clinic and demonstrator in anatomy. His doctoral thesis, published the following year, was entitled 'Contributions to our knowledge of vision from the subjective point of view'. Purkinje's basic studies on vertigo had been carried out on the swings and roundabouts in the public amusement park in Prague. Like so many of his later studies, it was conducted at minimal expense, using himself as his experimental model.

Only 5 years after qualification, in 1823, Purkinje was appointed Professor of Physiology at the University of Breslau, then in Prussia, now in Poland. In the opening sentences of his inaugural lecture, Purkinje described his philosophy in surprisingly modern terms:

'The most important problem of a physician appears to me not his efforts to renew a life already shattered, or to sustain a life a little longer, but efforts towards the support of evolving life; to protect it from harm and to bring it to the peak of perfection and beauty ... the physician who answers this task may be called an artist;

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otherwise he merely performs the task of a repair man.'

Soon a flood of original observations and publications appeared from his department, both from Purkinje himself and from his gifted assistants. He was the first to describe cilia and their movements. In 1830 he described the germinal vesicle in the fertilised chick egg. He noted the subendocardial cells of the interventricular area of the heart in 1845, although it was not until 60 years later that Tawara suggested their function in the conduction of the cardiac impulse.

In 1837, Purkinje published his account of the large cells of the cerebellum, with elaborate and intricate axons. This first appeared in a Prague medical journal in German. These cells are second only in size in the brain to the Betz cells of the cerebral cortex. The following year, he gave the first description and illustration of the intracytoplasmic pigment, neuromelanin, in the substantia nigra of the midbrain.

Purkinje's histological studies were aided, without doubt, by the fact that it was he who introduced the microtome to replace the razor in the laboratory preparation of tissue sections.

In his physiological investigations, he described the Purkinje effect, which is the much reduced sensitivity to dim red light compared with dim blue light. Purkinje introduced the term 'plasma' for the fluid that remains when red cells are separated from the blood and the term 'protoplasm' for the material contained within the cell. Much of this extensive new material appeared in his two volumes entitled 'Observations and experiments investigating the physiology of the senses' and 'New subjective reports concerning vision'.

In pharmacology, Purkinje was an enthusiastic self-experimenter, believing that the healthy subject gave more accurate results than those obtained from animal experiments or studies on sick patients. Thus, he studied the effects of camphor, opium, belladonna (atropine) and turpentine on himself and his assistants.

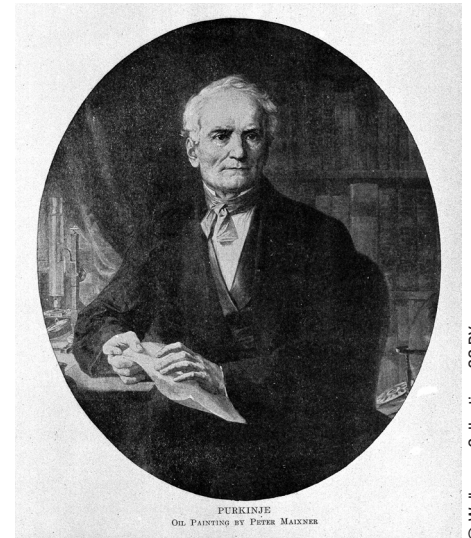


Figure 1. Portrait of JE Purkinje by Peter Maixner.

Purkinje, unlike the majority of leading European physiologists of his time, never settled down to write a comprehensive textbook. Many of his important contributions appeared for the first time in little known provincial medical journals or in the proceedings of various medical societies. As far as I can discover, he never travelled beyond the boundaries of the Austro-Hungarian empire and thus was less well known than he deserved to be in the western world during his lifetime.

Sadly, his enormously productive years in Breslau were marked by personal tragedies. In 1832, both his two young daughters died of cholera and, 3 years later, his wife died during an epidemic of typhoid fever. He never remarried, but remained a generous host to his students and visitors.

In 1850, at the age of 63 years, Purkinje was invited to fill the chair of Physiology in Prague, an invitation he was only too delighted to accept. In Prague he founded the first *Czech Medical Journal* and the Society for Czech Physicians, as well as being elected to the Czech parliament.

Jan Purkinje died in 1869, at the age of 89 years, 150 years ago. A truly remarkable medical scientist. **BJHM**

Conflict of interest: none.