Simon-Emmanuel Duplay's (1836–1924) essay on cancer contagion

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Abstract Simon-Emmanuel Duplay was a distinguished example of the French clinicopathological school and his researches on cancer inaugurated the modern period in oncology. In his book entitled *Les tumeurs*, he presents and analyses his research and those of his contemporaries on cancer contagion.

Keywords Duplay · Cancer transmission · Cancer parasite · Coccidian theory

Introduction

At the end of the nineteenth century, cancer was a major clinical and therapeutical issue. Its pathogenesis remained a mystery giving rise to hypothesis upon transmission. At the same period, the development of microbiology led to the intensive microbiological study of tumors. Practically, every new microorganism that could be detected was also found in cancerous tissues and some authors claimed that inoculation with these organisms could lead to the development of cancer, inducing theories on cancer transmission. In 1892, Simon Duplay Professor of clinical surgery found an “Anti-cancer league” with the help of several of his colleagues in the Faculty of Medicine in Paris as Paul Reclus (1847–1914), Julien Brault (1862–1916) and Ellie Metchnikov (1845–1916) head of the Pasteur

Institute Laboratory [1]. The main idea of this project was to combine all medical disciplines to promote the scientific research on cancer. Furthermore, Duplay with his collaborator Maurice Cazin published in 1903, a book entitled *Les tumeurs*, where they collect and comment the knowledge of their contemporaries for cancer.

Duplay's life and carrier

Simon-Emmanuel Duplay was born in Paris on 10 September 1836. Coming from an illustrious family, his grandfather was Robespierre's personal secretary and his father Mathieu Simon Maurice Duplay (1805–1872), an eminent doctor of the Parisian hospitals, Duplay completed his studies in Paris medical school and in 1872 became in charge of the clinical surgery lessons in the Faculty of Medicine. In 1880, he was appointed professor of external pathology and in 1890 became professor of clinical surgery at Necker hospital and later on the prestigious Hôtel Dieu. Member of French Society of Surgery he became Academician in 1879 and in 1887, he was decorated with the medal of the Officer of the Legion of Honor (Fig. 1). During his carrier, he modified and improved the surgery of hypospadias; the so-called Duplay operation is a plastic procedure for the congenital deformed penis. In addition, he described first the subacromial or subdeltoid bursitis named Duplay disease, he developed a method for the reduction in transversal fractures and he followed researches on the treatment of cerebral trauma.

Besides his books on surgery, Duplay left an important scientific work on cancer. His essays entitled *The tumors*, *On contagion and inoculation of cancer*, *Report on cancer's etiology*, *The parasitic theory of cancer*, *Experimental researches on the transmission of cancer* promoted

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Fig. 1 Portait of Simon-Emmanuel Duplay

the cancer research on clinical, epidemiological and experimental point of view.

Simon Duplay died on 16 January 1924 in Paris [2].

On cancer's contagion

From 17–19th century, cancer was believed to be as infectious as tuberculosis. So, the cancer hospital founded in Rheims by Jean Godinot in 1740 was forced to move in 1779 because it was thought that the patients might infect the citizens. Also in Netherlands, Nicolas Tulp (1593–1674) described the case history of an old woman with breast cancer who believed to have passed the disease on to her maid [3]. Duplay as well, in his book entitled *The tumors* declared that cancer may be transmitted by a suffering person to a healthy one among the inhabitants of the same house or the same village [4] and he refers to Arnaudet that indicated as vectors of the cancer contagion the water and the cider. The same period Charles Albert Fiessinger (1857–1942) mentioned a cancerous epidemic observed in a group of three houses, where he saw occurring, in 4 years, four cases of malignant neoplasms; in these cases, the way of transmission was the scattering of the bandage used by a woman affected by breast cancer [5]. The surgeon Octave Gueillot (1854–1943) also observed 23 cases of men suffering from penile cancer resulting by a uterine cancer of their female partners. However, as Duplay concludes “nothing authorizes us to propagate the idea that the cancer patients are as contagious as the tuberculous. Jacobs conducted a research in 1896 in a cancer hospital and he did not find a single case of infection in the treating staff” [6].

The bacterial theory

Duplay believed that the main interest concerning the etiology of cancer remained in the research of its determining cause and he mentions “the ancient theory considered cancer as the result of a simple histological aberration. We shall leave aside the researches made at the beginning of bacteriology, in which the ordinary bacteria were considered as characteristics of cancer; so many scientists as Rappin, Scheuerlen, Domingos-Freire, Koubassof etc., believed to have discovered the germ of cancer. When they tried to isolate microbes in the malignant tumors, they had negative results. In addition, we have to quote that Balance, Shattock and Pfeiffer demonstrated that the bacillus described by Scheuerlen was just a common saprophyte. They took samples from the center of recently removed non-ulcerated tumors, they inoculated them in different nutritional media as broth, gelose or gelatin and they never obtained the slightest culture. We also took samples from neoplasm's either ulcerated or collected postmortem, we inoculated them in animals and we did not notice any development in cultures [4]. In 1872, Gustave Nepveu indicated also the presence of bacteria in tumors and considered their role secondary and in no case pathogenic [7].

The coccidian theory

The coccidian theory of cancer has been the point of departure for a very large number of investigations.

As Duplay mentioned, the beginning of that theory was the work of Albert Neisser (1855–1916) published in 1888 on the mollusum contagiosum [4]. Neisser considered mollusum contagiosum as a real epitheliomatous evolution due to the presence of intracellular parasites belonging to the group of coccids.

Rudolf Virchow (1821–1902) considered the corpuscles of the mollusum as parasites belonging to the gregarines group, separated afterwards in coccides. Therefore, a new way was opened allowing the demonstration of the coccidian theory of cancer. In 1888, a German bacteriologist Richard Frederick Pfeiffer (1858–1926) described a case of generalized carcinoma, where he observed the presence of microsporides. Pfeiffer's observation seemed to be the first one containing the description of sporozoaires in a carcinoma [8].

Following year, the French histologist Charles Malassez (1842–1909) and the urologist Joaquin Albarran (1860–1912) analyzing an epithelial cancer of skin noticed the presence of round elements, often encysted, situated in the center of epidermic globes, resembling with the coccides of the rabbit's liver. In 1890, Nile Sjöbring detected in six cases of breast cancer, one case of hepatic cancer and one of

prostate cancer, the presence of parasites and he grouped them among coccides [4].

The bacteriologist Amédée Borrel (1867–1936) was the first opposing the coccidian nature of the epithelial cancers and showed that these descriptions did not represent coccides, but epithelial cells in evolution. According to Duplay's book, the coccidian theory was contradicted in 1891 by Cazin and Duplay in a communication where they summarize the results of the histological examination of a large number of epithelial cancers, in whom they had attempted to study the coccides indicated in cancer and they concluded that they represent different stage of the cell evolution towards the maturity [9].

Russell's cancer parasite

As Duplay refers, in 1890 William Russell reported "cancer parasites" after staining cancerous tumors by solutions of carbolfuchsin and green of iodine. He described them as round bodies, strongly colored in red, without nucleus and without any trace of organization. He did not hesitate to classify them among the specific parasites of the cancerous tumors. He identified parasites in almost every cancer tumor he examined. The parasite was present intracellular and extracellular. The smallest parasites were barely visible microscopically and the large parasites were as large as red blood cells [4].

Knowing the work of Russell, Duplay and Cazin studied these hyaline bodies and by applying the Russell's method of coloration they concluded that the bodies of the English scientist were the results of a degeneration procedure and not specific elements of cancer [10].

Also, Duplay collaborating with the eminent pathologist Maurice Letulle (1853–1929) specializing in the morphopathological study of tuberculosis found these bodies not only in epitheliomas, but also in tuberculous tissue. Nepveu confirmed Duplay and Letulle and he added some interesting observations regarding the origin of these fuchsin bodies. According to him, these bodies may arise from the proliferation of leukocytes or from the destruction of red blood cells [4].

In a microscopic study of cancer and tuberculosis published in 1892, Klein concluded that Russell's parasites were not microbes, but large granules produced by fat assimilation. As Duplay reports in his book, the supporters

of the parasitic theory were emphasizing: on the presence of elements resembling to parasites in the cancerous tissues (whatever was round and without nucleus was listed in the group of cancer parasites) and on the inoculation in animals (some scientists obtained the production of tumors in the place of inoculation and the death of animal) [4].

Russell's pleomorphic parasites are called Russell bodies by modern day pathologists and they are characterized as eosinophilic, large, homogenous immunoglobulin-containing inclusions usually found in a plasma cell undergoing excessive synthesis of immunoglobulin.

Conclusion

The nineteenth century scientist's conceptions on cancer pathogenesis gave rise to theories upon cancer transmission. Simon-Emmanuel Duplay was a distinguished example of the French clinicopathological school, by undertaking researches in cancer, he emphasized first the need to go beyond anatomoclinical attempts inaugurating the modern period of oncology.

Conflict of interest None.

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