

Schiller-Duval Bodies and the Scientists Behind them

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Abstract

Schiller-Duval body is a distinctive pathological structure seen in the endodermal sinus pattern of yolk sac tumor. This manuscript provides a concise review about this structure and the scientists behind it.

Keywords: Eponym; Schiller-duval body; Yolk sac tumor

Schiller-Duval Body

Schiller-Duval body, (Figures 1a and 1b), is a distinctive pathological structure seen in the endodermal sinus pattern of Yolk Sac Tumor (YST) [1-5]. It consists of a central vessel surrounded by tumor cells -the whole structure being contained in a cystic space often lined by flattened tumor cells. It represents an attempt to form yolk sacs [2].

YST is also called Endodermal Sinus Tumor (EST) because there is a link to its discovery. It is Schiller's stressing of the unique glomeruloid structure that led the Danish pathologist, Dr. Gunnar Teilmum, to compare it with the yolk sac endodermal sinuses of the rat placenta described first by M Duval, resulting in Teilmum's application of this eponym 'Schiller-Duval bodies' for these structures in yolk sac tumors [4,5].

The histology of YST is variable, but usually includes malignant endodermal cells. It can have a multitude of morphologic patterns such as reticular, endodermal sinus-like, microcystic, and papillary [1].

Schiller-duval bodies on histology are pathognomonic for YST and seen in the context of the endodermal sinus-like pattern.

Schiller-Duval bodies are said to resemble a glomerulus. They have a mesodermal core with a central capillary, all lined by flattened layers of both visceral and parietal cells [1].

Schiller-Duval bodies are present in approximately 50% of YST. Immunofluorescent stain may show eosinophilic hyalin-like globules both inside and outside the cytoplasm that contain Alpha-fetoprotein (AFP) and alpha 1-antitrypsin [1].

YST is a member of the germ cell tumor group of tumors (GCTs). GCT is a neoplasm derived from germ cells. Germ cell tumors can be cancerous or non-cancerous tumors. Germ cells normally occur inside the gonads (ovary and testis) [2,3].

More than 95% of testicular cancers are germ cell tumors. YST represents the most common testicular cancer in children. While in adult seminomas followed by mixed germ cell tumors (MGCTs) are the most common testicular germ cell tumors. The MGCTs are commonly composed of an YST and a Teratocarcinoma [3].

The Ovarian Germ Cell Tumors (OGCTs) represent 15-20% of all ovarian tumors. More than 90% of ovarian cancers are classified as epithelial. Malignant Ovarian Germ Cell Tumors (MOGCTs) constitute 3-5% of all ovarian malignancies. This is because most germ cell tumors are teratomas and most teratomas are benign [2,3]. OGCTs are subdivided into germinomatous and non-germinomatous tumors. The most common types of non-germinomatous tumors are yolk sac and immature teratoma. YST is the second most frequent histological subtype of MOGCTs, after ovarian dysgerminoma. They account for 20% of MOGCTs and are frequent especially in childhood and in early adulthood, between 18-30 years old woman [2,3].

The three sensitive diagnostic markers for yolk sac tumor are alpha-fetoprotein, glypican-3 and SALL4. High values of AFP orientate strongly to diagnosis of YST. Furthermore it is a sensible marker for tumor's evolution [2,3].

Walter Schiller (1887-1960)

Walter Schiller, was an Austrian-born American pathologist. He was born on 3 December 1887, in Vienna (Figure 2). He was the only

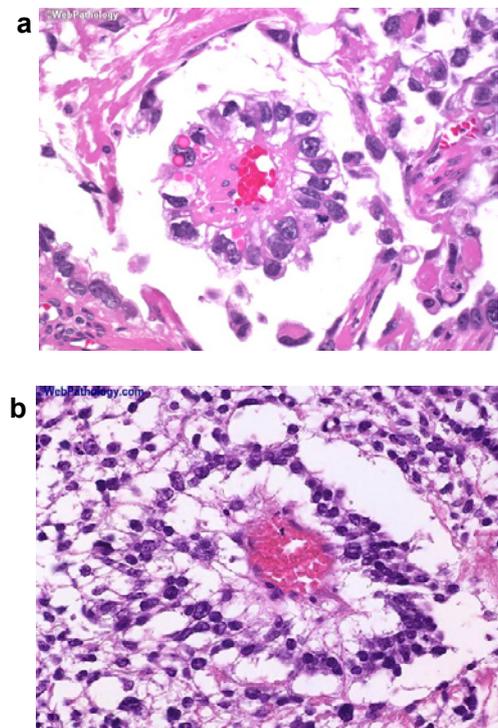


Figure 1: Schiller-Duval body. A papillary structure that grows into a cystic space. The papilla is covered by tumor cells and has a central capillary. It presents in nearly 50% of endodermal sinus tumors. A courtesy of Dharam Ramnani, MD, Webpathology.com.

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Received January 25, 2014; Accepted February 06, 2014; Published February 13, 2014

Citation: Al Aboud K, Al Aboud D (2014) Schiller-Duval Bodies and the Scientists Behind them. Gynecol Obstet (Sunnyvale) 4: 209. doi:10.4172/2161-0932.1000209

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child for his parents who were of Jewish descent [6]. He studied in Vienna, and received his doctorate from the University of Vienna in 1912 [6,7].

He was the Director of Laboratories at the second Gynecological Clinic of the University of Vienna from 1921 to 1936 [6,7].

He immigrated to the United States in 1937, with his wife and two daughters due to the threat of Nazism. He worked first in New York and then became Director of Pathology at the Cook County Hospital, Chicago in 1938 [6,7].

In 1939, Dr. Walter Schiller, reported a series of ovarian tumors under the designation 'mesonephromaovarii'. However, it was subsequently shown by others that the neoplasms were not of mesonephric derivation and that Schiller's paper contained neoplasms we now recognize as yolk sac tumor and others as clear cell carcinoma [4,5].

He is also credited with pointing out that the granulomatous infiltrate of dysgerminoma, which had previously sometimes been mistaken as representing tuberculosis, was unrelated to that infectious disease [4,5].

In addition to Schiller-Duval bodies; the name of Walter Schiller is linked eponymously to Schiller's test or Schiller's Iodine test [8]. In this test iodine solution is applied to the cervix in order to diagnose cancer. It, also, refers to dipping cervical cone biopsy specimens in iodine as a method of deciding which areas should be selected for histological examination was assessed. It is not specific for cervical cancer [8], as areas involved by other conditions such as inflammation, may also not take up the stain.

Schiller died on 2 May 1960, in Evanston, Illinois, USA [6,7].

Mathias-Marie Duval (1844-1907)

Mathias-Marie Duval, was a French professor of anatomy and histology [9-11] (Figure 3). He was among the famous scientists who worked in histology in Strasbourg [11].



Figure 2: Walter Schiller (1887-1960).



Figure 3: Mathias-Marie Duval (1844-1907).

Duval was born, February 7, 1844, in Grasse; which is a commune in the Alpes-Maritimes department, on the Riviera. His father was botanist.

He studied medicine in Paris, and later served as professor of histology at the medical faculty in Strassburg [9-11], which has held a pioneer place in histology since the cellular theory was formulated in 1839 [11].

Duval is known for research involving placental development in mice and rats. He was one of the pioneers in elucidating the intricate placental histology of different mammalian groups and was the first to identify trophoblast invasion in rodents [9,10].

Duval was active in promoting Darwin's evolutionary ideas. But, he refrained from extrapolating too quickly his findings in rodents to other mammalian groups. In his view detailed histological studies on complete series of specimens had to come first [10].

Duval died February 28, 1907, in Paris [9].

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