Aims: Pediatric small round blue cell tumors (PSRBCT) are an intriguing and challenging collection of neoplasms. Light microscopy of small round blue cell tumors identifies small round cells. Pediatric small round blue cell tumors include several entities, such as nephroblastoma, neuroblastoma, rhabdomyosarcoma, Ewing's sarcoma, retinoblastoma, malignant lymphoma, and small cell osteosarcoma among others. The differential diagnosis of these neoplasms may be controversial at a light microscopy level, even using immunohistochemistry. A faint staining or an ambiguous background can deter pathologists from making the proper diagnostic decision.

Methods: A review of the personal experience at four centers is considered here. In addition, single cell technologies are added to renew the interest of TEM.

Results: Molecular biology may provide an overwhelming amount of data challenging to distinguish them, and some translocations may be seen in more than one category. Thus, TEM can be extremely valuable. In particular, tumor cells associated with tangles of cytoplasmic processes containing neurosecretory granules can diagnose neuroblastoma. Conversely, a marked variation in size, shape and cytoplasmic differentiation with most tumor cells containing prominent dilated cisterns of rough endoplasmic reticulum and bundles of thick and thin filaments with well-formed Z-bands may infer the diagnosis of rhabdomyosarcoma. The presence of an intracytoplasmic deposit of glycogen may suggest Ewing's sarcoma. At the same time, a cellular arrangement in a tubular configuration with a well-formed basal lamina may advocate the diagnosis of nephroblastoma. Single-cell sequencing are booming.

Conclusions: Single-cell sequencing technologies are useful to discover the genome, transcriptome, metabolome, and epigenome of single cells. These techniques can show the differences and evolutionary relationships of innumerable cells. Here, we speculate that TEM may have an intriguing role for single-cell sequencing technologies and their applications in oncology, microbiology, reproductive and environmental sciences emphasizing the essential role that single-cell sequencing methods play in these areas.

Educational Objectives

By the end of the presentations, participants will be able to:

1. Define to general role of TEM in pathology
2. Identify the role of TEM for PSRBCTs
3. Determine the relevance in applying new technologies to TEM studies