

Mott Cells - at a Glance

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ABSTRACT

Mott cells are cells which have grape like intra cytoplasmic inclusions arranged in a globular manner. They are architecturally plasma cells. They were also named as Immunoglobulins and Russel bodies by researchers. The term Russel body is a Pathologists term. Russel has described the intracytoplasmic inclusions as cherry red inclusion bodies. Similar other intracytoplasmic inclusions that appear in plasma cells are called Dutcher bodies which now are considered as pseudo inclusions as per the WHO 2008 classification. There are several Pathologies which contain these Russel bodies, they are Multiple Myelomas, Leukemias, Chronic infections, gastric carcinoma and so on. Hence a range of Pathologies ranging from neoplasms to reactive lesions have demonstrated these cells. Many special stains like PAS, MGG can be used to observe and demonstrate these cells. Also a panel of IHC markers can be useful to study these cells using Immunohistochemistry techniques. If the balance between synthesis, degradation and secretion is lost, it results in the formation of mutant forms. Thus a thorough understanding of these cells is essential.

Keywords: Russel bodies, plasma cells, intracytoplasmic inclusions, Mott cells

INTRODUCTION

Mott cells are cells which have grape like inclusions resembling grapes or morula which are modified plasma cells. These unique cells were named after a surgeon F.W Mott, who successfully traced these cells in 1901 in the monkey brains with trypanosomiasis.^{1,2}

Somewhere in 1890, Russel assumed these cells to be fungi, as they had cytoplasmic globular inclusions. Further studies and researches demonstrated these inclusion bodies as immunoglobulins and were named as Russel bodies.³

Architecturally these cells are plasma cells with big intracytoplasmic inclusions arranged in a globular fashion, displacing the round clock-face nucleus eccentrically (figure-1).^{2,4,5} The term Russel body (RB) is often used by pathologists. For some, it is referred to as a single large spherical immunoglobulin inclusion that displaces the nucleus, while others refer to it as multiple morular accumulation, within the cytoplasm of cells.⁶ The intracytoplasmic inclusions in Mott cells appear to be pale blue grape-like and the Russel bodies have been described as being cherry red inclusions.⁷

There are similar other intracytoplasmic inclusions that appear in plasma cells that are called Dutcher bodies and are demonstrated to be PAS positive. These bodies were initially reported as intranuclear inclusions and later got extruded into the cytoplasm through a ruptured membrane. As per the WHO classification 2008, these bodies fall under the category of pseudo-inclusions, after these bodies have been demonstrated to be intracytoplasmic that invaginate into or over lie the

nucleus and appear to be intra nuclear. Dutcher bodies are also seen dually, as a part of neoplastic cells and reactive phenomena. Hence it becomes mandatory to describe these bodies correctly.⁸

MOTT CELLS – PATHOLOGY

Mott cells which contain Russel bodies in the cisternae of the dilated endoplasmic reticulum (ER), are often seen associated with lesions like Multiple Myeloma, Leukemias, Auto immune disorders, Monoclonal gammopathies and chronic infections.^{1,3,6} They have also been reported as a reactive phenomena in gastric carcinoma associated with EBV.⁹

Gastritis which is caused by *Helicobacter pylori* has been found to be associated with an aggregation of plasma cells with Russel bodies and earned the name Russel body gastritis. Few cases of Barrets oesophagitis were reported that demonstrated an immunological inflammatory reaction with an accumulation of Mott cells. This lead to a working name Barrets oesophagitis.³ Multi nucleated Mott cells have been reported to be seen in Plasmacytomas along with other morphological variants like flame cells and Dutcher bodies.^{10,11} Thus, a range of pathologies from reactive phenomena to various neoplasms demonstrated these cells. This emphasized the need to understand their biochemical nature and prognostic significance in greater detail.⁶ Various special stains like Periodic Acid Schiff (PAS), May Grewald Giemsa (MGG) can be useful to locate these cells. Also, a panel of IHC markers like B220, CD5, CD43, CD11b²

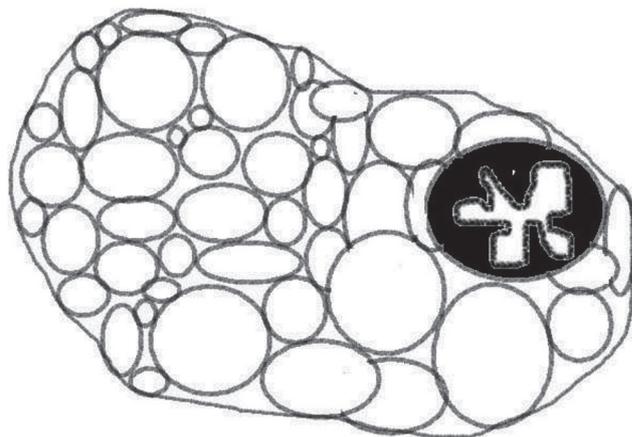


Figure-1: Schematic figure of a mott cell showing morular inclusions (Russel bodies)

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and so on can be useful to carry out immunohistochemistry studies.

Looking into the biogenesis of the RB, it has been found that the fine balance between the synthesis, degradation, and secretion of immunoglobulin is lost, that results in accumulation of prone mutant forms.⁵ In such specialized cells, immunoglobulins can accumulate in a non-functional state ranging from crystal bodies to amyloid fibrils.⁵ This frequency of presence of RB in Mott cells has been found to be due to somatic hypermutation of immunoglobulin genes.¹

CONCLUSION

Hence, a detailed insight into the pathophysiology of Mott cells is needed to diagnose various pathologies.

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