An Immuno Histopathological Study: Unraveling the Molecular Determinants of Disease

Immunohistochemistry (IHC) and histopathology are powerful tools used in medical diagnostics and biomedical research. IHC combines the specificity of antibodies with the morphological information provided by tissue sections, enabling the visualization and localization of specific proteins within cells and tissues. Histopathology involves the microscopic examination of tissue samples to study their structure and identify abnormalities that may be indicative of disease.

Preeclampsia/Eclampsia Part 2: Inflammation of Mesenteric Adipose Tissue and Lymph Nodes: An Immuno-histopathological Study by Stephen Ward

★★★★★ 5 out of 5

Language	: English
File size	: 15890 KB
Text-to-Speech	: Enabled
Screen Reader	: Supported
Enhanced typesetting	: Enabled
Print length	: 106 pages
Lending	: Enabled

This book provides a comprehensive overview of the principles and applications of immunohistochemistry and histopathology in disease diagnosis and research. It covers the theoretical foundations, technical aspects, and practical applications of these techniques in various disease

settings, including cancer biology, infectious diseases, and autoimmune disFree Downloads.

Immunohistochemistry: Principles and Techniques

Immunohistochemistry is a laboratory technique that utilizes antibodies to detect and visualize specific proteins in tissue sections. Antibodies are proteins produced by the immune system that bind specifically to their target antigens. In IHC, antibodies are labeled with a chromogen or fluorescent dye, allowing them to be visualized under a microscope.

The chapter on immunohistochemistry principles and techniques covers the following topics:

* Antibody structure and properties * Antigen retrieval methods * Primary and secondary antibody selection * Immunohistochemistry protocols * Controls and quality assurance

Histopathology: Principles and Techniques

Histopathology involves the microscopic examination of tissue samples to study their structure and identify abnormalities. Tissue samples are typically obtained from biopsies or surgical specimens and processed to create thin sections that can be stained and examined under a microscope.

The chapter on histopathology principles and techniques covers the following topics:

* Tissue processing and staining techniques * Histopathological interpretation * Reporting and documentation

Applications in Disease Diagnosis

Immunohistochemistry and histopathology are widely used in disease diagnosis. IHC can be used to identify specific biomarkers, such as cancer-associated proteins or infectious agents, within tissue samples. Histopathology can provide information about the type, grade, and extent of a disease, as well as the presence of inflammation or other abnormalities.

This book discusses the applications of immunohistochemistry and histopathology in the diagnosis of various diseases, including:

* Cancer: IHC can help identify tumor type, grade, and prognosis; histopathology can provide information about tumor morphology and invasion. * Infectious diseases: IHC can detect and identify infectious agents; histopathology can provide information about the extent and severity of infection. * Autoimmune disFree Downloads: IHC can identify immune cell infiltrates and autoantibodies; histopathology can provide information about tissue damage and inflammation.

Applications in Biomedical Research

Immunohistochemistry and histopathology are also valuable tools in biomedical research. IHC can be used to study the localization and expression of proteins in different tissues and cell types, providing insights into cellular processes and disease mechanisms. Histopathology can be used to assess the effects of experimental interventions or treatments on tissue structure and function.

The chapter on applications in biomedical research covers the following topics:

* Biomarker discovery * Cancer biology research * Infectious disease research * Autoimmune disease research

An Immuno Histopathological Study: Unraveling the Molecular Determinants of Disease is a comprehensive and up-to-date resource for researchers, clinicians, and students in the fields of pathology, immunology, and biomedical sciences. This book provides a thorough understanding of the principles and applications of immunohistochemistry and histopathology, empowering readers to utilize these techniques effectively in disease diagnosis and research.

PLOS PATHOGENS

RESEARCH ARTICLE

Unraveling the molecular determinants of the anti-phagocytic protein cloak of plague bacteria

Daniel T. Peters, Antonio Reifs, Alvaro Alonso-Caballero, Azzeldin Madkour, Helen Waller, Brendan Kenny, Raul Perez-Jimenez, Jeremy H. Lakey

Abstract

The pathogenic bacterium Yersinia pestis is protected from macrophage engulfment by a capsule-like antigen, F1, formed of long polymers of the monomer protein, Caf1. However, despite the importance of this pathogen, the mechanism of protection was not understood. Here we demonstrate how F1 protects the bacteria from phagocytosis. First, we show that Escherichia coli expressing F1 showed greatly reduced adherence to macrophages. Furthermore, the few cells that did adhere remained on the macrophage surface and were not engulfed. We then inserted, by mutation, an "RGDS" integrin binding motif into Caf1. This did not change the number of cells adhering to macrophages but increased the fraction of adherent cells that were engulfed. Therefore, F1 protects in two separable ways, reducing cell adhesion, possibly by acting as a polymer brush, and hiding innate receptor binding sites needed for engulfment. F1 is very stable and we show that E. coli expressing weakened mutant polymers are engulfed like the RGDS mutant. This suggests that innate attachment sites on the native cell surface are exposed if F1 is weakened. Single-molecule force spectroscopy (SMFS) experiments revealed that wild-type F1 displays a very high mechanical stability of 400 pN. However, the mechanical resistance of the destabilised mutants, that were fully engulfed, was only 20% weaker. By only marginally exceeding the mechanical force applied to the Caf1 polymer during phagocytosis it may be that the exceptional tensile strength evolved to resist the forces applied at this stage of engulfment.

Author summary

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