Infection and Inflammation: Impacts on Oncogenesis
Contributions to Microbiology

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Infection and Inflammation: Impacts on Oncogenesis

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26 figures, 6 in color, and 5 tables, 2006
Contents

VII In Remembrance of Rudolf Virchow (1821–1902)
    Schmidt, A. (Witten)

IX Foreword
    Dittmar, T.; Zaenker, K.S.; Schmidt, A. (Witten)

General Aspects

1 In Memoriam of Rudolf Virchow: A Historical Retrospective Including
   Aspects of Inflammation, Infection and Neoplasia
    Schmidt, A. (Witten); Weber, O.F. (Bonn)

16 Aneuploidy and Cancer: From Correlation to Causation
    Duesberg, P.; Li, R. (Berkeley, Calif.); Fabarius, A.; Hehlmann, R. (Mannheim)

45 Adult Stem Cell Theory of the Multi-Stage, Multi-Mechanism
   Theory of Carcinogenesis: Role of Inflammation on the
   Promotion of Initiated Stem Cells
    Trosko, J.E.; Tai, M.-H. (East Lansing, Mich.)

Specific Pathogens

66 Helicobacter pylori and Gastric Neoplasia
    Leung, W.K. (Hong Kong)

81 Schistosomiasis and Neoplasia
    Yosry, A. (Cairo)
101 Relevant Oncogenic Viruses in Veterinary Medicine: Original Pathogens and Animal Models for Human Disease
Truyen, U. (Leipzig); Löhchelt, M. (Heidelberg)

Infection, Inflammation and Neoplasia

118 The Inflammatory Tumor Microenvironment and Its Impact on Cancer Development
de Visser, K.E. (Amsterdam); Coussens, L.M. (San Francisco, Calif.)

138 Co-Opting Macrophage Traits in Cancer Progression: A Consequence of Tumor Cell Fusion?

156 Carcinogenesis Driven by Bone Marrow-Derived Stem Cells
Dittmar, T.; Seidel, J.; Zaenker, K.S.; Niggemann, B. (Witten)

Chemokine-Directed Metastasis

170 Chemokine-Directed Metastasis
Gomperts, B.N.; Strieter, R.M. (Los Angeles, Calif.)

191 Involvement of Chemokine Receptors in Organ-Specific Metastasis
Zlotnik, A. (San Diego, Calif.)

200 Visualization of Tumor Cell Extravasation

209 Options for Visualizing Metastatic Disease in the Living Body
Helms, M.W. (Muenster); Brandt, B.H. (Hamburg); Contag, C.H. (Stanford, Calif.)

Outlook and Perspectives

232 Infection, Inflammation and Neoplasia: An Interdisciplinary Challenge
Zaenker, K.S. (Witten)

240 Author Index

241 Subject Index
In Remembrance of Rudolf Virchow (1821–1902)

In 1863, Rudolf Virchow postulated in his well-recognized comprehensive publication ‘Die krankhaften Geschwülste – Malignant Neoplasias’ that inflammation is one of the predisposing factors of tumor genesis. He also noted that infectious diseases such as syphilis and tuberculosis show signs of a ‘tumor
process’ and were often difficult or even impossible to separate from a ‘genuine’ malignant and/or benign tumor process. Virchow’s hypothesis has almost been forgotten and ignored for more than a hundred years, but experienced a renaissance in the past 10 years.

Axel Schmidt
Obtaining knowledge on the etiopathology of neoplasias and trying to elaborate a consistent explanation for neoplastic syndromes is a scientific and public issue which might be as old as mankind itself.

In this current volume of the Karger book series *Contributions to Microbiology*, we give an up-to-date overview about the aspect of the connection between inflammation and cancer. This connection was originally postulated by the German physician and pathologist Rudolph L.C. Virchow in 1863 in his well-recognized comprehensive publication ‘Die krankhaften Geschwülste – Malignant Neoplasias’. Virchow recognized inflammation to be one of the predisposing factors of tumor genesis. He also noted that infectious diseases such as syphilis and tuberculosis show signs of a ‘tumor process’ and were often difficult or even impossible to separate from a ‘genuine’ malignant and/or benign tumor process.

Virchow’s hypothesis has been almost forgotten and ignored for more than a hundred years, but has experienced a renaissance in the past 10 years. Because of the increasing knowledge about the inflammatory micro-environment, it is now generally accepted that carcinogenesis is more than a simple summation of mutation events in single cells. In fact, cancer is the result of a sustained proliferation of cells embedded in an environment rich in inflammatory cells, DNA-damage-promoting agents, cytokines, and chemokines, and which can be followed from a chronic infection with pathogens such as *Helicobacter pylori* or *Schistosoma haematobium*. Moreover, it is becoming clearer and clearer that the chronic inflammatory microenvironment does not exert its transforming
capacity on differentiated tissue cells, but rather on undifferentiated cells. In other words: Cancer might be a stem cell-based disease. Recent results substantiate this hypothesis by showing that bone marrow-derived stem cells can give rise to gastric cancer in the presence of a chronic *Helicobacter pylori* infection. Thus, Virchow’s hypothesis has received new impact, which will definitely have implications on future pathological research and therapeutic options which are based on the use of bone marrow-derived stem cells for tissue function restoration.

However, increasing knowledge on the inflammatory microenvironment and on the dynamic interplay of growth factors and chemokines in the growth, migration, and organ-specific spreading of tumors is starting to have implications in both cancer prevention as well as cancer treatment. Clinical trials are currently underway and the results are encouraging. Anti-inflammatory-based strategies are efficacious in preventing neoplastic progression and malignant conversion, and inhibition of the interplay of chemokines and their receptors reduces metastasis.

We are glad that so many internationally recognized experts accepted our invitation to contribute to this exciting volume. We sincerely thank them all for their interest in this important topic and that they, despite their other duties and responsibilities, found the possibility to present us with excellent and comprehensive overviews of the most important recent findings in their field of scientific engagement within this topic.

We further thank Mr. *T. Nold* and Mr. *F. Brian* from Karger Publishers for their helpful assistance and excellent collaboration with this challenging project.

We hope that this volume may encourage new scientific approaches within this interdisciplinary field of oncology/tumor pathology, immunology, inflammation, and infectious agents as well as closer interdisciplinary collaboration on this fascinating and important medical and pathophysiological issue in the future.

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