



# Single-cell T cell receptor sequencing of paired human atherosclerotic plaques and blood reveals autoimmune-like features of expanded effector T cells

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Atherosclerosis is a lipid-driven chronic inflammatory disease; however, whether it can be classified as an autoimmune disease remains unclear. In this study, we applied single-cell T cell receptor sequencing (scTCR-seq) on human carotid artery plaques and matched peripheral blood mononuclear cell samples to assess the extent of TCR clonality and antigen-specific activation within the various T cell subsets. We observed the highest degree of plaque-specific clonal expansion in effector CD4<sup>+</sup> T cells, and these clonally expanded T cells expressed genes such as *CD69*, *FOX* and *FOSB*, indicative of recent TCR engagement, suggesting antigen-specific stimulation. CellChat analysis suggested multiple potential interactions of these effector CD4<sup>+</sup> T cells with foam cells. Finally, we integrated a published scTCR-seq dataset of the autoimmune disease psoriatic arthritis, and we report various commonalities between the two diseases. In conclusion, our data suggest that atherosclerosis has an autoimmune component driven by autoreactive CD4<sup>+</sup> T cells.

Atherosclerosis is the major underlying pathology of acute cardiovascular events, such as myocardial infarction and stroke. It is characterized by accumulation of lipids and subsequent inflammation of the medium and large arteries. As low-density lipoprotein (LDL) particles are important instigators of atherosclerosis, cardiovascular disease (CVD) has

primarily been treated as a lipid-driven disorder, with a treatment focus on lowering LDL cholesterol levels. Nonetheless, inflammation plays a critical role in perpetuating the growth and instability of atherosclerotic lesions, highlighted by the success of recent clinical trials with anti-inflammatory agents<sup>1,2</sup>. Elucidating the dominant inflammatory

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# Tcell Receptor Use In Human Autoimmune

**M Carnoy**



## **Tcell Receptor Use In Human Autoimmune:**

*T-cell Receptor Use in Human Autoimmune Diseases* Mark M. Davis, Joel Buxbaum, 1995 Animal models of some autoimmune diseases have indicated restricted T cell receptor use and have suggested therapies based on those data. Patients with naturally occurring diseases have not shown a consistent picture of receptor utilisation. This volume discusses the spectrum of T cell receptor use in human disease, the relationship between the human and animal findings and the biological and therapeutic implications of the former.

*The Molecular Pathology of Autoimmune Diseases* Argyrios N Theofilopoulos, Constantin A. Bona, 2002-12-06 Remarkable advances have been made in the pathogenesis of autoimmunity such as with bone marrow transplantation which is becoming a powerful strategy in treating certain life threatening diseases. *The Molecular Pathology of Autoimmune Diseases* is a concise and centralized resource for information on the topic with a special focus on the molecular and genetic basis of these disorders. Dozens of international experts devote themselves to illuminating the reader in this volume with discussions on the basic aspects of autoimmune processes to systemic and organ specific diseases. This volume is an invaluable reference to students and professionals in immunology and related fields.

*Werner & Ingbar's The Thyroid* Lewis E. Braverman, David S. Cooper, 2012-10-08 Werner Ingbar's *The Thyroid: A Fundamental and Clinical Text* 10th Edition has been extensively revised and streamlined to deliver the most comprehensive coverage of the thyroid including anatomy, development, biochemistry, physiology, pathophysiology and treatment of all thyroid disorders. Entirely new chapters on the surgical management of thyroid cancer, thyroid disruptors and thyroid hormone analogs are in this edition. New authors and an international group of contributors elevate this classic text that includes extensive clinical coverage of thyroid dysfunction, its effects on other organ systems. Also addressed are clinical controversies regarding the ageing thyroid, subclinical hypothyroidism and hyperthyroidism and thyroid disease in pregnancy. New to this edition: Twenty three chapters authored by new contributors and international experts. A companion website with fully searchable text for quick reference. Three new chapters discuss surgical management of thyroid cancer, thyroid disruptors and thyroid hormone analogs to keep you up to date on the latest advances in the field.

**Immune Regulation and Immunotherapy in Autoimmune Disease** Jingwu Zhang, 2007-01-25 This book critically reviews both clinical and immunological aspects of autoimmune disease with a strong emphasis on multiple sclerosis (MS). Research in MS is one of the fastest developing areas in modern medicine. It employs some of the newest concepts in autoimmune mechanisms and an array of new treatments that would have been considered science fiction only two decades ago. It is an area in which research findings are being actively translated into treatment strategies. Advances in this area have both clinical and scientific implications for other autoimmune conditions that share many similarities with MS. The book, which comprises 24 chapters contributed by experts and thought leaders in the field, is designed to provide new insights into two arenas: our current understanding of autoimmune mechanisms and immune regulation and the latest developments in immunotherapy. This book

is intended for both researchers and clinicians Its purpose is not only to provide a comprehensive review on the recent advances in the two arenas mentioned above but also to reflect the current opinions or concepts that influence our thinking about the disease mechanisms and our way of treating MS patients Many of these issues have emerged from recent studies and are somewhat contradictory to traditional thinking For example recent studies have indicated that MS is more heterogeneous in many aspects than traditionally thought Pathologically in addition to demyelination and inflammation there is axonal loss or damage detectable in the central nervous system CNS lesions Cumulated Index Medicus ,1987

Werner & Ingbar's the Thyroid Sidney C. Werner, Sidney H. Ingbar, Lewis E. Braverman, Robert D. Utiger, 2005 Completely updated for its Ninth Edition this classic text provides comprehensive coverage of every aspect of thyroid anatomy development biochemistry physiology pathophysiology and treatment of all thyroid disorders This edition has a more international group of contributors and new chapters on mortality in thyroid disease oncogenes radioiodine treatments for carcinoma trophoblastic tumors and subacute and acute infectious thyroiditis Chapters address clinical controversies regarding subclinical hypothyroidism and hyperthyroidism The section on laboratory assessment of thyroid function has been reorganized for easier look up of function tests Autoimmune Endocrine Disease Anthony P. Weetman, 1991-12-19

Endocrine Autoimmunity and Associated Conditions A.P. Weetman, 2012-12-06 Autoimmunity is the most common cause of endocrine disorders This volume provides an up to date summary of recent advances in this important field In addition it describes developments in our understanding of conditions such as vitiligo and pernicious anaemia which are frequently associated with autoimmune endocrinopathies There is a detailed review of animal models of endocrine disease which have contributed greatly to current knowledge Furthermore the aetiology pathogenesis and treatment of the clinical disorders are discussed in depth The book will be of interest to anyone working in the areas of endocrinology and immunology

Immunopharmacology in Autoimmune Diseases and Transplantation L. Endresen, Ø. Førre, H.E. Rugstad, 2013-11-11 This book incorporates the latest advances in immunopharmacological treatment One objective has been to provide appropriate bridges between the basic sciences of immunology and pharmacology on the one hand and clinical medicine on the other A further intention has been to emphasize those advances in immunology and pharmacology that are of clinical importance while retaining those facts that while not new remain clinically useful The immunology section provides the necessary background for immunopharmacological treatment The chapters on individual cell types include normal surface markers mode of activation and activation markers and functions in health and disease The chapters on pharmacology give comprehensive information on immunosuppressive drugs in regular use today their biochemical and cellular mechanisms of action pharmacokinetics dosage regimens therapeutic responses adverse reactions and drug interactions and tolerance In addition certain therapeutic principles that are still in an experimental phase are described for example immunotoxins thymic hormones and interleukins The book presents comprehensive information on various autoimmune diseases the

etiopathogenetic immune mechanisms where these are known and the current possibilities for immunopharmacological intervention The specific disease section also covers rare situations fluctuations in disease patterns and subgroups of patients and immunopharmacological treatment in these situations Altogether the book represents a practical textbook for clinicians and advanced students who want to be updated on therapeutic principles with regard to autoimmune diseases and transplantation

**Current Concepts in Autoimmunity and Chronic Inflammation** Andreas Radbruch, Peter E. Lipsky, 2006-09-08 The immune system has been known to be capable of distinguishing self from non self since the pioneering work of Paul Ehrlich more than a century ago Originally described in experiments studying blood transfusion compatibility the principle of humoral autotoxicity is still valid although today the phenomenon is usually described in terms of tolerance or ignorance A great deal has been learned about the various processes preventing self reactivity normally These include processes that operate during immune cell ontogeny and subsequently on reactivity of mature lymphocytes in the periphery They encompass mechanisms that are intrinsic to potentially reactive lymphocytes and can result in central or peripheral deletion or the alteration of functional potential In addition there are influences that are extrinsic to potentially autoreactive lymphocytes including the function of regulatory cells differentiation state of antigen presenting cells availability of self antigen the cytokine and chemokine milieu as well as the trafficking patterns involved in generating productive immune interactions It is clear that the immune system devotes a considerable effort to the avoidance of the development of potentially pathogenic self reactivity Despite this the development of self reactivity is relatively common though the development of autoimmune disease is less frequent autoimmune diseases such as rheumatoid arthritis multiple sclerosis systemic lupus erythematosus psoriasis thyroiditis and myasthenia gravis are all too common and can cause considerable morbidity and even mortality

**Immunology of the Connective Tissue Diseases** G. S. Panayi, 2012-12-06 Connective tissue diseases demand study because of their frequency morbidity and mortality They present intriguing challenges in the fields of diagnosis management and research Their range has now expanded enormously so that no individual can master the whole subject particularly as this relates to their immunological basis Immunology of Connective Tissue Diseases has been written by experts who are either clinical or basic scientists The book presents up to date reviews of the immunological basis of connective tissue diseases as it impacts on diagnosis pathogenetic concepts disease monitoring and management The book is aimed at physicians interested in understanding the immunological basis of these diseases and at immunologists who are either entering this field for the first time and would like to have a convenient state of the art account of its status or who are researching in one area and would like to acquaint themselves with the developments which have taken place in others

**Biomedical Index to PHS-supported Research**, 1991 Contemporary Targeted Therapies in Rheumatology Josef S. Smolen, Peter E. Lipsky, 2007-10-18 Targeted therapies of rheumatic diseases have become a reality and have completely changed patient care as well as patient expectations Initial success with therapies

aimed at blocking TNF and IL 1 has stimulated the development of additional targeted approaches focused on other cytokines as well as specific cells and pathways involved in the path

**Biomedical Index to PHS-supported Research:**  
**pt. A. Subject access A-H**, 1992 Investigating and harnessing T-cell functions with engineered immune receptors and their ligands Bruno Laugel, 2015-01-22 T cells are an essential component of the immune system that provide protection against pathogen infections and cancer and are involved in the aetiology of numerous autoimmune and autoinflammatory pathologies Their importance in disease the relative ease to isolate expand and manipulate them ex vivo have put T cells at the forefront of basic and translational research in immunology Decades of study have shed some light on the unique way T cells integrate extrinsic environmental cues influencing an activation program triggered by interactions between peptide MHC complexes and the antigen recognition machinery constituted of clonally distributed T cell receptors and their co receptor CD4 or CD8 The manipulation of these molecular determinants in cellular systems or as recombinant proteins has considerably enhanced our ability to understand antigen specific T cell activation to monitor ongoing T cell responses and to exploit T cells for therapy Even though these principles have given numerous insights in the biology of CD8 T cells that translate into promising therapeutic prospects as illustrated by recent breakthroughs in cancer therapy they have proven more challenging to apply to CD4 T cells This Research Topic aims to provide a comprehensive view of the recent insights provided by the use of engineered antigen receptors and their ligands on T cell activation and how they have been or could be harnessed to design efficient immunotherapies

**International Review of Cytology**, 1997-11-17 International Review of Cytology presents current advances and comprehensive reviews in cell biology both plant and animal Articles address structure and control of gene expression nucleocytoplasmic interactions control of cell development and differentiation and cell transformation and growth Authored by some of the foremost scientists in the field each volume provides up to date information and directions for future research Karyotypic Evolution of Cells in Culture Sucrose Transport in Higher Plants Interaction of Cytoskeletal Proteins with membrane Lipids The Cell Biology of Autoimmune Diseases Multiple Forms of Tubulin Different Gene Products and Covalent Modifications Translocation of Proteins across the ER Membrane Fresh Ideas, Foundational Experiments: Immunology and Diabetes Hubert M. Tse, Marc S. Horwitz, Brian T. Fife, 2019-09-20

**Biological Approaches to Rational Drug Design** David B. Weiner, William V. Williams, 2022-01-27 This book exploits an understanding of disease pathogenesis by applying a variety of biological agents to therapy It provides a broad overview of the current methodologies being applied to biological approaches to rational drug design and in depth analyses of progress in this specific field

*Endocrinology - E-Book* J. Larry Jameson, Leslie J. De Groot, 2010-05-18 ENDOCRINOLOGY edited by J Larry Jameson MD PhD and Leslie J De Groot MD has been considered the definitive source in its field for decades Now this landmark reference has been exhaustively updated to bring you the latest clinical guidance on all aspects of diagnosis and treatment for the full range of endocrine and metabolism disorders including new information on diabetes obesity MEN I and

II disorders of sex determination and pituitary tumors Entirely new chapters on Lipodystrophy Syndromes Lipoprotein Metabolism and Genetic Disorders of Phosphate Homeostasis keep you well informed on today s hot topics You ll benefit from unique global perspectives on adult and pediatric endocrinology prepared by an international team of renowned authorities This reference is optimally designed to help you succeed in your demanding practice and ensure the best possible outcomes for every patient Overcome virtually any clinical challenge with detailed expert coverage of every area of endocrinology authored by hundreds of leading luminaries in the field Provide state of the art care with comprehensive updates on diabetes obesity MEN I and II disorders of sex determination and pituitary tumors brand new chapters on Lipodystrophy Syndromes Lipoprotein Metabolism and Genetic Disorders of Phosphate Homeostasis expanded coverage of sports performance including testosterone androgen research and bone growth and deterioration and the newest discoveries in genetics and how they affect patient care Make the best clinical decisions with an enhanced emphasis on evidence based practice in conjunction with expert opinion Rapidly consult with trusted authorities thanks to new expert opinion treatment strategies and recommendations Zero in on the most relevant and useful references with the aid of a more focused concise bibliography Locate information more quickly while still getting the complete coverage you expect     Endocrinology Adult and Pediatric: The Thyroid Gland Leslie J. De Groot,J. Larry Jameson,2013-06-01 Access all of the latest advances in thyroid disorder management on your favorite eReader with Endocrinology Adult and Pediatric The Thyroid Gland Brought to you by the same leading endocrinologists responsible for the highly acclaimed two volume Endocrinology clinical reference this new thyroid disorder eBook enables you to give your patients the benefit of today s best know how Stay abreast of the newest knowledge and advances in thyroid disease including the use of thyroglobulin assays and ultrasound vs isotope scanning in thyroid cancer the latest understanding of Graves eye disease the use of I 131 in management of multinodular goiter T4 transport defects causing thyroid hormone resistance best practices in management of thyroid disease during pregnancy and much more Benefit from authoritative guidance on thyroid testing Make the best clinical decisions with an enhanced emphasis on evidence based practice in conjunction with expert opinion Count on all the authority that has made Endocrinology 6th Edition edited by Drs Jameson and DeGroot the go to clinical reference for endocrinologists worldwide Consult this title on your favorite e reader conduct rapid searches and adjust font sizes for optimal readability Compatible with Kindle nook and other popular devices

## **Tcell Receptor Use In Human Autoimmune** Book Review: Unveiling the Magic of Language

In an electronic digital era where connections and knowledge reign supreme, the enchanting power of language has be much more apparent than ever. Its ability to stir emotions, provoke thought, and instigate transformation is really remarkable. This extraordinary book, aptly titled "**Tcell Receptor Use In Human Autoimmune**," written by a highly acclaimed author, immerses readers in a captivating exploration of the significance of language and its profound impact on our existence. Throughout this critique, we shall delve into the book is central themes, evaluate its unique writing style, and assess its overall influence on its readership.

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