reflected by the fact that much of the evidence generated by clinical trials does not translate into practice. Russell E. Glasgow explores the reasons for this chasm. Barriers for translation of trial evidence exist at all levels: intervention, design, setting, value systems, inadequate training and funds, and at the larger social and political level. Use of inclusive research designs like community-based participatory research and practical trials to identify interventions that can be put into practice, is advocated. The competing interests of internal and external validity still preclude their wide use, although in recent years their use has increased, especially in primary care.

The article on cost-effectiveness analyses provides a historical perspective of how cost considerations entered the realm of public health and outlines its applications in various areas. It succeeds in making an appeal to use cost-effectiveness analyses in assessment of services.

In the section on 'Epidemiology and biostatistics', Luke *et al*. describe the methodology of network analysis with examples from the study of transmission networks in HIV. They also illustrate the importance of networks in communication and building social capital. The article provides a historical account of network analysis, starting from its roots in the Konisberg bridge problem and traces its development over the years. The need for inclusion of network thinking in public health curricula is emphasized by the authors.

The boom in information and communication technology has largely benefitted epidemiologic research. However, there have been some minor setbacks and the article on telephone surveys highlights important issues that have arisen in the last few years due to the use of answering machines, caller IDs and mobile phones. The authors also identify facilitating factors like computer-assisted telephone interviewing, call scheduling and interactive voice response techniques that have been made possible by technology and sound optimistic about the opportunity for reaching hitherto unheard voices through mobile phones.

The topics reviewed in this book are based on studies originating mainly from the United States, yet they carry a universal appeal. Public health needs a range of committed professionals to serve its mandate. The current review provides much room for introspection on what public health researchers and practitioners can do, given the relative lack of quality data in our local context. With a diverse range of topical articles, the current edition of the *Annual Review of Public Health* is likely to interest a wide audience.

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Annual Review of Immunology, 2007. Annual Reviews Inc, 4139, El Camino Way, P.O. Box 10139, Palo Alto, California 94303-0139, USA. Vol. 25. 880 pp. Price not mentioned.

It is an exciting exercise to review the *Annual Review of Immunology, 2007*. It is a pleasure to start the review with Peter Doherty's words, 'My research career has focused on complex experimental systems, principally virus-induced infectious processes. I have always run my own experimental program and never had a major mentor, although I have had many great colleagues'. Doherty's contribution to immunology has been significant since, with Rolf Zinkernagel he discovered MHC I-restricted $CD8^+$ T-cell recognition, a finding that, together with the 'single T-cell receptor/altered self' hypothesis that they developed to explain their results, led to the 1996 Nobel Prize. The second article by Arnold *et al*. describes the influence of glycosylation on the biological function and structure of immunoglobulins. These are the major line of defence against the extracellular pathogens, since each is characterized by a distinctive set of glycoforms that reflect the wide variation in number, type and location of their oligosaccharides. In a given physiological state, glycoform populations are reproducible; therefore, disease-associated alterations may be utilized for diagnosis and therapeutics. Kollet *et al.* give a brief account of the role of osteoclasts in host defence. The orchestrated interplay is discussed between bone remodelling, the immune system and the endosteal stem-cell niches in the context of stem-cell proliferation and migration during homeostasis, which is accelerated during alarm situations. Bone remodelling by bone-forming osteoblasts and bone-resorbing osteoclasts dynamically alters the bone inner wall and the endosteum region, which harbours osteoblastic niches for hematopoietic stem cells. The mechanism of recruitment and mobilization has been elucidated, which consists of stress signals that drive migration of leukocytes and progenitor cells from the bone marrow reservoir to the circulation and drive their homing to injured tissues as part of host defence and repair. Dustin and Rice illustrate the immune response to hepatitis C virus (HCV). It is a remarkably successful pathogen, establishing persistent infection in more than two-thirds of those who contract it. Its success is related to its abilities to blunt innate antiviral pathways and evade adaptive immune responses. The tolerogenic liver environment may provide cover. HCV's error-prone replication strategy permits rapid evolution under immune pressure and persistent high levels of antigens may contribute to immune exhaustion.

Charles Serhan highlights the importance of the resolution of inflammation and the return of tissues to homeostasis. The resolvins and protectins are potent stereoselective agonists that control the duration and magnitude of inflammation, joining the lipoxins as signals in resolution. The article describes the mapping of these circuits and recent advances in the actions of the novel proresolving lipid mediators offer exciting new potential for therapeutic control. The article by Welniak *et al.* gleans on allogeneic hematopoietic stem cell (HSCT) as an effective adoptive cellular immunotherapy for the treatment of a number of cancers. The immunobiology of allogeneic HSCT is unique in transplantation, in that it involves potential immune recognition and attack between both donor and host. Williams and Bevan elegantly describe how effector and memory cytotoxic T-cells (CTLs) differentiate and survive *in vivo* in response to infection. Understanding the mechanisms behind the differentiation of effector and memory CTL is of increasing importance to develop vaccination strategies against a variety of established and emerging infectious diseases. Liu *et al.* review recent progress on how thymic stromal lymphopoietin expressed within thymus and peripheral lymphoid and nonlymphoid tissues regulates dendritic cell (DC) mediated central tolerance, peripheral T-cell homeostasis, and inflam-

matory Th2 responses. Kastelein *et al.* highlight the biology of IL-23 and IL-27 in resistance to infection, immune-mediated inflammation and cancer. IL-12 has been recognized as the canonical cytokine that links innate and adaptive immunity, and with the discovery of IL-23 and IL-27 as cytokines related to IL-12, there has been a concerted effort to understand the relationship between these factors.

Leen and Foster have reviewed promising strategies to improve adoptive T-cell therapy for the treatment of cancer. Two novel approaches for increasing the efficacy have been proposed. The first involves genetic modification of tumour-specific T-cells to improve their biological function. The second requires modifications to the host environment to improve the homeostatic expansion of infused T-cells. Rabinovich *et al.* discuss different strategies employed by tumours to thwart immune responses, including tumour-induced impairment of antigen presentation, the activation of negative costimulatory signals, elaboration of immunosuppressive factors, regulatory T-cells, natural killer T-cells, and distinct subsets of immature and mature DCs and strategies to overcome immunological tolerance and promote tumour regression. Bendelac *et al.* highlight NKT cells regulating a range of immunopathological conditions and the mechanisms and the ligands involved. NKT cell biology has emerged as a new field of research at the frontier between innate and adaptive immunity. Ma *et al.* elucidate the roles of the SLAM and SAP (SLAM-associated protein) families of molecules in immune regulation and how perturbations in the signalling pathways involving these proteins can result in different disease. Iwasaki highlights how mucosal DCs process external information and direct appropriate responses by mobilizing various cells of the innate and adaptive immune systems to achieve homeostasis and protection. Mucosal surfaces contain specialized DCs that can recognize microorganisms which invade the mucosal barrier, and mount robust protective immunity. Marshak-Rothstein and Rifkin describe the role of immunologically active autoantigens in triggering toll-like receptors (TLRs) in the development of chronic inflammatory disease. TLRs play a critical role in tissue repair and the clearance of cellular debris. However, failure to appropriately regulate self-responses triggered by certain TLRs can have serious consequences. Chen and Subbarao briefly describe the severe acute respiratory syndrome (SARS) and immune response and the role of pro-inflammatory cytokines and chemokines, particularly IP-10, IL-8 and MCP-1 during infection and the unusual lack of an antiviral interferon (IFN) response. The virus is susceptible to exogenous type-I IFN, but suppresses the induction of IFN. Pao *et al.* analyse the mechanism of action, regulation and physiological functions of nonreceptor protein-tyrosine phosphatases in immune cell signalling. Such an analysis indicates that protein-tyrosine phosphatases are as important as protein-tyrosine kinases in regulating the immune system.

Randall Davis reviews Fc receptor-like (FCRL) molecules homologous to the well-known receptors for the Fc portion of immunoglobulin (FCR). The FCRL are representatives of an ancient multigene family that share a common ancestor with the classical FCR. Park *et al.* assess the potential molecular basis for the function of death domain superfamily proteins domains to provide a comprehensive understanding of the function, structure, interaction and evolution of this important family of domains. Hislop *et al.* discuss different sets of proteins expressed during EBV's lytic and cell transforming infections and induction of qualitatively different cellular immune responses and the factors governing immunodominance hierarchies and their biological effectiveness. Luo *et al.* focus on integrin structure and its relation to affinity modulation, ligand binding, outside-in signalling, and cell surface distribution dynamics. Integrins are cell-adhesion molecules that mediate cell–cell, cell–extracellular matrix, and cell–pathogen interactions. They play a critical role in leukocyte trafficking and migration, immunological synapse formation, costimulation and phagocytosis. Petrie and Zuniga-Pflucker provide information on the signals that the thymus delivers to uncommitted progenitors to immature T-committed progenitors, to produce functional T-cells. Cells that home to the thymus from the marrow possess the potential to generate multiple T and non-T lineages, but signals unique to the thymic microenvironment compel multipotent progenitors to commit to only T lineage. In light of recent data, Davis *et al.* describe that both helper and cytotoxic T-cells can detect even a single molecule of an agonist peptide-MHC, alphabeta T-cells are clearly a type of sensory cell, comparable to any in the nervous system. With the multitude of specificities available to most T-cells, they can thus be considered as a sensory organ, trained on self-peptide-MHCs and primed to detect nonself. Lemaitre and Hoffmann review the current knowledge available on the molecular mechanisms underlying *Drosophila* defence reactions together with strategies evolved by pathogens to evade them. It relies on multiple innate defence reactions, many of which are shared with higher organisms. Cumano and Godin discuss the ontogeny of the hematopoietic system and the origin of hematopoietic stem cells (HSCs) and the potential locations where HSC generation might occur.

Allen *et al.* survey the current knowledge of chemokine : receptor structure and function, and its contribution to drug discovery. Chemokines are critical mediators of cell migration during routine immune surveillance, inflammation and development. Although chemokines evolved to benefit the host, inappropriate regulation or utilization of these proteins can contribute to or cause many diseases. Specific chemokine receptors provide the portals for HIV to get into cells, and others contribute to inflammatory diseases and cancer. Thus, there is significant interest in developing receptor antagonists. Weaver *et al.* discuss IL-17 family cytokines and the expanding diversity of effector T-cell lineages. Since its conception two decades ago, the Th1–Th2 paradigm has provided a framework for understanding T-cell biology and the interplay of innate and adaptive immunity. Naive T-cells differentiate into effector T-cells with enhanced functional potential for orchestrating pathogen clearance, largely under the guidance of cytokines produced by cells of the innate immune system that have been activated by recognition of those pathogens. IL-17 specifies differentiation of a new effector T-cell lineage-Th17, providing a new arm of adaptive immunity and presenting a unifying model that can explain many confusing aspects of immune regulation, immune pathogenesis and host defence.

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