Autoimmune Diseases
Affecting Ocular Surface

Essay
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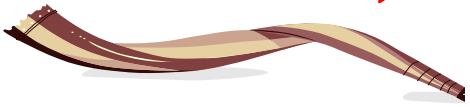

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List of Abbreviations

Abb.	Meaning
ALKC	Autoimmune lacrimal keratocon junctivitis
ANA	Antinuclear antibody
ANA	Antinuclear antibodies
APCs	Antigen presenting cells
BMZ	Basement membrane zone
CL	Contact lens
Co-Ag	Cornea-associated antigen
CSF	Cerebrospinal fluid
DC	Dendritic cell
DED	Dry eye disease
DMARDs	Disease-modifying antirheumatic drugs
GCA	Giant-cell arteritis
HCQ	Hydroxychloroquine
HLA	Human leukocyte antigen
IFN	Interferon
IL	Interleukin
iTreg	Induced in response to specific antigens
IVIG	Intravenous immunoglobulin
JIA	Juvenile idiopathic arthritis
KCS	Keratoconjunctivitis sicca
KDA	Kilo dalton
LFTS	Liver function tests
MMP	Mucous membrane pemphigoid

Abb.	Meaning
MRI	Magnetic resonance imaging.
MS	Multiple sclerosis
MU	Mooren's ulcerative keratitis
NKT	Natural killer T-lymphocyte
NPSLE	Neuropsychiatric systemic lupus erythematosus
nTreg	Naturally occurring tregs
OCP	Ocular cicatricial pemphigoid
PAN	Poly arteritis nodosa
PAS	Staining, periodic-acid schiff
PROSE	Prosthetic replacement of the ocular surface ecosystem
PUK	Peripheral ulcerative keratits
RA	Rheumatoid arthritis
RF	Rhumatoid factor
SJS	Stevens–johnson syndrome
SLE	Systemic lupus erythmatosis
SS	Sjogren's syndrome
TGF	Transforming growth factor
TNF	Tumor necrosis factor

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Introduction

Autoimmune diseases arise from an abnormal immune response of the body against substances and tissues normally present in the body (autoimmunity).

A number of autoimmune diseases exist in which the eye various parts of the eye may be attacked by the white blood cells. Often the autoimmune disease is systemic, i.e., a variety of organs throughout the body system are being attacked. Examples of such diseases include rheumatoid arthritis, systemic lupus erythematosus, polyarteritis nodosa, relapsing polychondritis, Wegener's granulomatosis, scleroderma, Behcet's disease, Reiter's disease, inflammatory bowel disease and ankylosis spondylitis ***(Beyda et al., 2010)*.**

A major understanding of the underlying pathophysiology of autoimmune diseases has been the application of genome wide association scans that have identified a striking degree of genetic sharing among the autoimmune diseases ***(Cotsapas and Hafler, 2013)***.

Aberrant activation of the innate and adaptive immune responses underlies the immunopathogenesis of these disorders. The etiologies are unknown, but the

general hypothesis predicts a combination of excessive or atypical stimuli and/or immunoregulatory dysfunction, combined with genetically predisposed factors and/or hormone imbalance provides an environment conducive to activation of autoreactive lymphocytes. These autoreactive T and B cells are the basis of autoimmune-mediated pathology ***(Cotsapas and Hafler, 2013)***.

Recent insights have provided a more refined appreciation for when and how these cells are activated and to their various functions. The emerging view suggests that the autoimmune response is shaped early-on after provocation by foreign and/or endogenous stimuli, and can be perpetuated by both T-cell-dependent and -independent mechanisms. Indeed, differences in these immunological events underlie the diversity of ocular surface autoimmune syndromes, and may also explain why some patients within a particular disease population are refractory to an otherwise effective treatment paradigm ***(Cotsapas and Hafler, 2013).***

For a disease to be regarded as an autoimmune disease it needs to answer to Witebsky's postulates (first formulated by ***Nguyen and Foster (1998):***

- Direct evidence from transfer of pathogenic antibody or pathogenic T cells indirect evidence based on reproduction of the autoimmune disease in experimental animals.
- Circumstantial evidence from clinical clues.
- Genetic architecture clustering with other autoimmune diseases.
    - It has been estimated that autoimmune diseases are among the ten leading causes of death among women in all age groups up to 65 years ***(Nguyen and Foster, 1998).***
    - A substantial minority of the population suffers from these diseases, which are often chronic, debilitating, and life-threatening. There are more than eighty illnesses caused by autoimmunity ***(Nguyen and Foster, 1998)***.

Aim of the Essay

The aim of this study is to discuss the recent advances on autoimmune diseases affecting ocular surface due to local and systemic autoimmunity.

Classification of Autoimmune Diseases

Autoimmune diseases can be broadly divided into systemic and organ-specific or localised autoimmune disorders, depending on the principal clinico-pathologic features of each disease ***(Cotsapas and Hafler, 2013).***

Systemic autoimmune diseases include SLE, Sjögren's syndrome, sarcoidosis, scleroderma, rheumatoid arthritis, cryoglobulinemic vasculitis, and dermatomyositis. These conditions tend to be associated with autoantibodies to antigens which are not tissue specific. Thus although polymyositis is more or less tissue specific in presentation, it may be included in this group because the autoantigens are often ubiquitous t-RNA synthetases ***(Cotsapas and Hafler, 2013).***

- **Local syndromes** which affect a specific organ or tissue:
    - Endocrinologic: Diabetes mellitus type 1, Hashimoto's thyroiditis, Addison's disease.
    - Gastrointestinal: Coeliac disease, Crohn's Disease, Pernicious anaemia.