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Atopic Dermatitis: New Trends and Perspectives

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In the past, atopic dermatitis was considered as a polyfactorial disease. In reality, that meant that its pathophysiogeny was not understood. Nowadays, atopic dermatitis appears to be really a polyfactorial disease: Gene polymorphisms are numerous (but those of filaggrin are very important), and numerous immune cells and skin cells are involved in the mechanisms of the disease.

Atopic dermatitis is an inflammatory disease characterized by pruritic skin lesions, immunodysregulation, disrupted epidermal barrier function, and IgE-mediated sensitization to food and environmental allergens. A primary defect in the epithelial barrier as a threshold event in atopic dermatitis appears more and more obvious. Peter Elias and Joan Wakefield excessively show how it could favor inflammation in atopic dermatitis, in addition with other factors [1]. Defects in the innate immunity are associated with skin barrier disorders. Andreas Wollenberg et al. show that inducible endogenous antibiotics such as the antimicrobial peptides cathelicidin and the beta-defensins may be defective in atopic dermatitis and that and depletion of type I IFN-producing plasmacytoid dendritic cells is possible, with superinfections as consequences [2].

Atopic dermatitis is obviously also related to adaptive immune response through interactions between immune cells, and many new data have been recently reported, changing our ideas about this topic. The review of Fu-Tong Liu et al. focuses on the role of IgE, mast cells, and eosinophils in the pathogenesis of atopic dermatitis [3]. The known functions of IgE in allergic inflammation suggest that IgE and IgE-mediated mast cell and eosinophil activation contribute to atopic dermatitis, but direct evidence supporting this is scarce. But their role does not seem to be constant, and many authors are in favor of a distinction between extrinsic and intrinsic forms of atopic dermatitis. Anne-Marie Roguedas-Contios and me discuss the interest to separate intrinsic and extrinsic forms of atopic dermatitis or atopic eczema and atopiform dermatitis [4].

Relationship between dendritic cells and lymphocytes are obviously crucial in atopic dermatitis but are more complex that we could initially suppose. Thomas Bieber brings new data about the role of Langerhans cells and other dendritic cells [5]. Dendritic cells control the balance of the adaptive immune response, and their functional behavior of dendritic cells is mainly dictated by their microenvironment. Atopic dermatitis is a paradigmatic disease where the inflammatory microenvironment has a deep impact on DC. The occurrence of lesions of atopic dermatitis and its regulation are related to different subsets of B cells and T cells, as described by Cyrille Hoarau [6]. Cytokines allow regulation of interactions between cells in the skin. Among cytokines, thymic stromal lymphopoietin is an interleukin 7 (IL-7)-like cytokine originally characterized by its ability to promote the activation of B cells and dendritic cells but also promotes T helper type 2 cell responses. IL-21, IL-25, and IL-33 are also novel cytokine players. Irit Carmi-Levy et al. show their very important role in atopic dermatitis and propose a modular view of cytokine networks in atopic dermatitis [7] because cyto-

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kines can be synthesized by T cells, innate immune cells, or keratinocytes.

Neurons initiate neurogenic inflammation and interact with numerous cells in the neurocutaneo-immune system [8]. Their pro-inflammatory functions are enhanced in atopic dermatitis. During times of stress, release of neurotransmitters is highly enhanced. Atopic eczema is one of the most pruritic skin diseases. Ulf Darsow explains how mediators of atopic eczema itch in the skin are still mostly unknown, but recent studies showed that the histamine 4 receptor plays an important role in itch pathophysiology, and tryptase and interleukin-31 are also involved [9]. Differences in itch perception and itch kinetics between healthy volunteers and eczema patients point toward an ongoing central nervous inhibitory activity in patients.

All these new data suggest new therapeutic perspectives [10]. Therapy of atopic dermatitis should comprise emollients, topical glucocorticosteroids or calcineurin inhibitors, phototherapies, immunosuppressants like cyclosporin A, and other treatments. All these treatments should be improved thanks to research. But new therapeutic perspectives should be given by topical anti-inflammatory substances, selective glucocorticoid receptor agonists, probiotics, interferon γ, TNFα inhibitors, inhibition of T cells or B cells, inhibition of IgE binding, and many other possibilities.

References

1. Elias PM, Wakefield J (2011) Therapeutic implications of a barrier-based pathogenesis of atopic dermatitis. Clin Rev Allergy Immunol (in press)
2. Wollenberg A, Räwer HC, Schauber J (2011) Innate immunity in atopic dermatitis. Clin Rev Allergy Immunol (in press)
3. Liu FT, Goodarzi H, Chen HY (2011) IgE, mast cells, and eosinophils in atopic dermatitis. Clin Rev Allergy Immunol (in press)
4. Roguedas-Contios AM, Misery L (2011) What is intrinsic atopic dermatitis? Clin Rev Allergy Immunol (in press)
5. Bieber T (2011) Dendritic cells in atopic dermatitis: new concepts. Clin Rev Allergy Immunol (in press)
6. Hoarau C (2011) The role of lymphocytes in atopic dermatitis. Clin Rev Allergy Immunol (in press)
7. Carmi-Levy I, Homey B, Soumelis V (2011) A modular view of cytokine networks in atopic dermatitis. Clin Rev Allergy Immunol (in press)
8. Misery L (2011) Atopic dermatitis and the nervous system. Clin Rev Allergy Immunol (in press)
9. Darsow U, Pfab F, Valet V, Huss-Marp J, Behrendt H, Ring J et al (2011) Pruritus and atopic dermatitis. Clin Rev Allergy Immunol (in press)
10. Misery L (2011) Therapeutic perspectives in atopic dermatitis. Clin Rev Allergy Immunol (in press)