SUMMARY

Atopic dermatitis is a major public health problem worldwide; the prevalence is 10–20% in children and 1–3% in adults. It is a chronic, relapsing, intensely pruritic inflammatory skin condition that usually affects infants, children and young adults. The rash is characterized by itchy papules and patches that become excoriated and lichenified, and typically has a flexural distribution**.** In most cases, it is associated with a personal or family history of atopy. The pathophysiology of AD is the product of a complex interaction between defects in immunologic responses, and skin barrier function.

Treatment modalities of atopic dermatitis include; avoidance strategies e.g. avoidance of allergens, food allergens, aeroallergens, contact allergy and irritant factors; topical therapy as moistures for hydration of the skin, topical corticosteroids are still the mainstay in the treatment of atopic dermatitis attacks, but they have many side effects and should not be used in certain areas as face and groin. Topical immunomodulators as tacrolimus ointment and pimecrolimus cream represent a new modality in the treatment of AD in adults and children, but they are very expensive. Systemic treatments in the form of Cyclosporine, Mycophenolate mofetil, Azathioprine are also used in the treatment of AD, but many side effects were recorded. Recombinant interferon gamma, Methotrexate, leukotriene inhibitors, oral pimecrolimus and intravenous immunoglobulin were also used, however, none have been approved by the FDA for treatment of AD.

Biotherapy is a treatment to stimulate or restore the ability of the immune (defense) system to diseases through biological therapy by stimulating the immune system to work harder or smarter. The main important biotherapy used in treatment of atopy is probiotics.

Probiotics are live microorganisms that when ingested might have a good effect in the prevention or treatment of a specific pathologic condition. Scientific interest in the composition and function of the skin's microflora is currently experiencing a revival, and in fact, has become one of the most exciting and rapidly developing areas in cutaneous biology. A major driving force for this development has been the discovery that epidermal keratinocytes have the potential to affect the cutaneous microflora by producing antimicrobial peptides. Also, recent research efforts to understand the control of skin barrier functions unambiguously point to a close link between physical immunological and cell biological properties of the skin and its microflora**.**

The gut is a major immune organ in humans. It has been estimated that the number of small intestinal intraepithelial lymphocytes is more than half of the T cell number estimated for peripheral lymphoid organs. The activation of naı¨ve T cells takes place in the gut associated lymphoid tissue where differentiation of the activated lymphocytes occurs in Peyer's patches from where the lymphocytes circulate to the peripheral circulation. The gut immune system has a dual role: it provides defense against infectious agents, but also induces tolerance to harmless food and microbial antigens encountered in the gut. Oral tolerance is a major compartment of

peripheral tolerance, and its control of the immune response is not necessarily restricted locally but may include systemic effects.

The worldwide rise in atopic diseases (eczema, food allergy, hay fever and asthma) was most predominant in the westernized countries and occurred in such a pace that this could never be solely explained by changes in the genetic make-up. Therefore the causes of the atopic epidemic are generally believed to be of environmental origin.

It is now proposed that allergic diseases including AD, results from a fundamental failure of underlying immune regulation. Microbial exposure arguably provides the strongest environmental signal for normal postnatal maturation of the immune system and also induces the maturation of antigen presenting cells and T-regulatory cells, which are essential for programming and regulating the T-cell response. It appears likely that microbial activation of regulatory pathways through microbial pattern recognition molecules (Toll like receptors [TLRs]) plays a central role in reducing the risk of immunologically mediated disease, including TH2-mediated allergic responses.

This is likely to be of greatest relevance in early life when immune programming is initiated and less significant in relation to a mature immune system in older children and adults.

Although there are studies suggesting favorable effects of probiotics on AD, it is generally accepted that larger controlled studies with well defined probiotic bacteria and perhaps mixtures of several such strains are needed to determine the role of these products in therapy.