

Eczema and dermatitis**Assistant Prof. Dr. Khudair K. Al.Kayalli****College of medicine Diyala University****Eczema :-**

Definition- eczema is an inflammatory skin reaction characterized histologically by spongiosis with varying degrees of acanthosis and superficial perivascular lymphohistiocytic infiltrate , with clinical features including : itching , scaling and clustered papulo-vesicles , with a wide range of external and internal factors acting singly or in combination , can induce the condition .

Although the terms dermatitis and eczema are nowadays generally regarded as synonymous , so that all eczema is regarded as dermatitis but not all dermatitis is eczema .

Classification- eczema is classified into groups :-

A. Exogenous eczemas – are related to clearly defined external triggering factors , although inherited tendencies can also play a part , this group include :

1. Irritant contact dermatitis (ICD) .
2. Allergic contact dermatitis (ACD) .
3. Photo-contact dermatitis .
4. Eczematous polymorphic light eruption .
5. Infective dermatitis .
6. Dermatophytide .
7. Post-traumatic eczema .
8. Exanthematous drug eruption .

B. Endogenous eczema – it implies that the condition is not a result of exogenous or external environmental factors , i.e. is mediated by processes originating within the body , include :

1. Atopic dermatitis (AD) .
2. Seborrhoeic dermatitis .
3. Asteatotic eczema .
4. Discoid eczema .
5. Exudative discoid and lichenoid dermatitis .
6. Chronic superficial scaly dermatitis .
7. Pityriasis alba .
8. Hand eczema and pompholyx .
9. Gravitational eczema .
10. Juvenile planter dermatitis .
11. Metabolic or eczema associated systemic diseases .
12. Chronic hyperkeratotic palmer eczema .

In some types of eczema , both exogenous and endogenous are important in the aetiology .

Prevalence- in UK in Belfast 25% of patients with dermatoses had dermatitis , (15% hand eczema , 12%CD , 11%seborrhoeic , 7%discoid , 6%lichen simplex , 5%AD , 4%gravitational , 40%others) . In Iraq (Diyala Province) , the prevalence of dermatitis was 20% out of all dermatoses , (49% had hand eczema and CD , 21%AD , 10.5%seborrhoeic , 4%lichen simplex , 3%napkin dermatitis and 8.5%others) .

Certain patterns of eczema can be seen more commonly in particular age group , e.g. AD mostly in infancy and young children , discoid astestotic eczemas occurs particularly in elderly .

Histopathology- is according to the stage of eczema :

- a. **Acute form** – shows , spongiosis with formation of vesicles , acanthosis , variable infiltration of the epidermis by lymphocyte , with dense superficial lymphocytic dermal infiltration with histiocytes .
- b. **Subacute form** – spongiosis diminished , increasing acanthosis , with formation of a parakeratotic horny layer , moderate dermal lymphocytic infiltrate with histiocytes and decrease epidermal infiltrate .
- c. **Chronic form** – there is arthrokeratotic hyperkeratosis with areas of parakeratosis , marked acanthosis , elongation and broadening of the rete ridges , mild chronic dermal lymphocytic-histiocytic infiltrate and absence of epidermal infiltrate e.g. lichenification .

Pathogenesis- it involves the interaction between three things : **a. Triggering factor** , **b. Keratinocytes** , **c. T-lymphocytes** , which seems particularly important in most eczema types , e.g. in **ACD** , cell mediated immune response (type-4) is enhanced after exposure to trigger factor (haptens) , which induce epidermal damage (T-cell- mediated cytotoxicity) , in particular phase –induced keratinocyte apoptosis , which may be a final common path way in many types of eczema . **In ICD** , the three predominant processes are : ***disturbed barrier function** , ***epidermal cell damage** and ***release of inflammatory mediators and cytokines** , which induce morphological changes apparent histologically and clinically as eczema .

Secondary dissemination :

A very characteristic feature of eczema is it's tendency to spread far from it's point of origin . This is especially likely when the primary site of the eczema on the legs or the feet , the eczema may have been present for only a few days , or for many years , before dissemination occurs . The dissemination which is often preceded by an exacerbation at the primary site , usually occurs explosively . The secondary eruption may at first consist of small oedematous papules , but these soon become obviously eczematous and grouped

papulo-vesicles may become confluent in small plaques , occasionally the lesions take the form of red macules or weals , the distribution is usually symmetrical .

The **course** of the secondary eruption depends largely on the progress of the primary lesion , if the primary lesion remains acutely inflamed , the eruption increases in severity and may become generalized . If the patient is rested and the local lesion allowed to settle , the secondary eruption will subside , but will often recur very readily if the local lesion relapses , in small proportion of patients , the generalized secondary eruption evolves into an erythroderma , which may become self-perpetuating .

There are four main mechanisms of dissemination :

- 1. Spread by contact with external allergen** – i.e. as a result of contact of new areas of the skin with a specific external allergen , the eczematous response is a symmetrical and it's progress is irregular , e.g. a contact dermatitis of the lower leg induced by lanolin ointment , may spread to the hand and the face as a result of casual contact during application of the ointment , other e.g. use of topical medication in chronic venous eczema of the lower leg lead to secondary dissemination , with positive patch test in over 90% of cases (allergy to topical therapy) .
- 2. Spread by ingestion or injection of an allergen** – i.e. in other cases , an eruption originally induced by sensitivity to topical allergen (e.g. ACD) may relapse after ingestion or injection of the same chemical , e.g. medication that can be used topically or systemically . The eruption tends to be wide spread and more or less symmetrical and is usually of sudden onset , the diagnosis may be suspected when the eczematous eruption dose not conform to the recognized pattern of endogenous eczema , yet can not be related to external contact or to dissemination from a primary focus .
- 3. Conditional hyperirritability ('angry back' syndrome)** – this term refers to the phenomenon where by an area of inflamed skin on one part of the body results in generalized hyperirritability of the skin sites , that are distant from the primary site of inflammation . There is considerable evidence that eczematous patients are more vulnerable to mild primary irritants than normal people , but the increased reactivity dose not persist after the eczema subside . The 'angry back' syndrome is clinical phenomena in which a strongly positive patch –test response can increase the percentage of false –positive reactions on the back at the same time , this suggests that an abnormal cell-mediated immune response could be occurring .
- 4. Bacterial hypersensitivity** – heavily infected eczema will some times disseminate in the absence of demonstrable allergic sensitivity to topical medication , it is probably that allergy to bacteria or their products is some times a factor in the dissemination .

Infective dermatitis (microbial eczema):

Definition- eczema that is caused by microorganisms or their products , which clears when the organisms are eradicated . This should be distinguished from infected eczema , in which eczema resulting from some other cause is complicated by secondary infection (bacterial or viral) .

Pathology- is generally that of subacute or chronic eczema , in which spongiosis is combined with acanthosis , hyperkeratosis and patchy parakeratosis , dermis shows inflammatory infiltrate of polymorphnuclear and lymphocytic cells that invade the epidermis to a variable extent .

Pathogenesis- the mechanism by which the microorganisms causes eczema is not understood , but the possibility that bacterial antigens may play a role .

Clinical features- the distinction between infective and infected eczema may be difficult .

Infected eczema – shows erythema , exudation and crusting , the exudation may be profuse with crusting , or slight , with accumulation of layers of somewhat greasy moist scale beneath which the surface is raw and red , with sharply defined margin and may be small pustule in the advancing edge , in flexures a deep and persistent fissures .

Infective eczema- usually presents as an area of advancing erythema , some times with micro-vesicles , seen predominantly around discharging wounds or ulcers , or moist skin lesions of other types . It is relatively common in patients with venous leg ulcer , which must be distinguished from contact dermatitis caused by topical therapy , other type of infective eczema , this that occasionally develop around lesions of molluscum contagiosum , interdigital spaces on the dorsum of the medial toes , tinea pedis may also become eczematous because of the over growth of Gram-negative organisms , chronic thread worm infestation , pediculosis or scabies .

Treatment- factors predisposing to infection should be sought and when possible eliminated . Mild forms are treated by topical antibacterial agents , in sever or wide spread infections systemic antibiotics are used , with topical wet compresses (e.g. K. permanganate solution) .

Dermatophytide :

Definition- it is an allergic reaction (response) to a dermatophyte infection elsewhere on the skin .

Irritant contact dermatitis (ICD):

Definition- ICD in a broad sense represents the Cutaneous response to the physical , toxic effects of a wide range of environmental exposures . The following types of irritant contact reaction may be distinguished :-

1. Burns .
2. Irritant contact dermatitis : a. acute (toxic) ICD , b. Cumulative irritant /insult CD .

3. **Transient or immediate –type , non-immune contact urticaria .**
4. **Symptomatic (subjective) irritant response .**
5. **Others : pimentary and granulomatous response and those localized to appendageal structures (folliculitis by tar and oil , acne –halogenated , miliria – ALCL –occlusion , hyperpigmentation –phototoxic agents , hypopigmentation – phenols , granulomatous –silica-talc –beryllium , alopecia –borax –chloroprene dimmers .**

History and epidemiology:

CD was first described to plants as long ago as 2000BC , when extract of the castor oil bean was rubbed into the scalp , as an irritant to promote hair growth . The prevalence of hand eczema in Sweden per one year period is 11% , female : male is 2:1 . 35%ICD , 22%AD, 19%ACD . In Iraq (Diyala province) the prevalence of CD is 10% of all skin diseases and 49% of all types of dermatitis , 34% was ICD and 15% was ACD out of all dermatitis .

Pathogenesis- the following factors are important :

1. **The skin barrier** – the skin provides the first and most important line of defense against exogenous noxious agents , **a. The surface film** , is the first part of the line of defense , which has a negligible influence on percutaneous absorption , stratum corneum hydration and on the barrier function of the skin . **b. Stratum corneum represented the** entire principle epidermal barrier , which is normally renewed every 17-27days , but barrier function can be restored in 2-5days following stripping or superficial injury , damage to stratum corneum is normally followed by an increase in percutaneous absorption and in transepidermal water loss , including irritant substances .
2. **Mechanism of action of irritant** – an irritant is any agent physical or chemical , which is capable of producing cellular perturbation if applied for sufficient time and in sufficient concentration . Dermatitis arise when the defense or repair capacity of the skin is exhausted , or when the penetration of chemicals will alter or damage skin cells excites an inflammatory response . Strong irritants will induce a clinical reaction in almost all individuals , whereas with less potent irritant , only the most susceptible individuals , and those with repeated contact with irritants will develop dermatitis .

Pathology – is variable according to the stage of the disease i.e. acute or chronic . Acute irritant form shows , spongiosis , intracytoplasmic vaculation , vesicular changes , sever forms shows necrolysis of epidermal cells with intra-or-sub epidermal vesicles and bulla(burn) . Chronic form (cumulative) shows hyperkeratosis with areas of parakeratosis , moderate to marked acanthosis and elongation of rete ridges .

Predisposing factors :**A. Individual factors :**

- 1. Genetic /racial background** – those with fair skin and Japanese are more susceptible to UVB and chemicals , then ICD , than those with black skin (thicker skin more protection) .
- 2. Age-** skin of the very young , neonate or premature is more vulnerable to some irritants than in older individuals , due to often a reduced inflammatory response to irritant substance .
- 3. Sex-** women more frequently report skin diseases than men , this is persumably relate to more exposure to irritants in women than men .
- 4. Neuro-psychological factors** – e.g. sleep deprivation , the stress and decrease activity , may resulted in delayed barrier recovery .
- 5. Site** – the effects of irritant contact varies from region to region on the body , thickness or type of stratum corneum , hair follicles , sweat ducts , potential for occlusion by body folds and inherent differences in keratinization and intercellular lipids are important in the barrier function of the skin e.g. skin of the face , scrotum and back of the hands is more permeable than other sites .
- 6. Skin diseases and atopy** – inflammatory changes in epidermis facilitate percutaneous absorption e.g. ACD can promote penetration of irritants and Vera-versa , atopic patients and those with AD are more liable to skin irritation than normal individuals .

B. Environmental factors :

- 1. Temperature** – higher temperature leads to a reduction in barrier function and increases the penetration of detergent through the skin , so the hot detergent appears more irritant than cold one . Cold alone will reduce the water content and plasticity of stratum corneum and lead to cracking .
- 2. Climate-** low humidity (ambient) is the single most important factor with regard to the water content of the stratum corneum , a change to a low dew point can occur suddenly during winter and can cause chapping even in normal persons . There is interaction between temperature and humidity .
- 3. Occlusion** – promotes percutaneous absorption and facilitate ski irritation and enhance the effects of irritants to which an individual has already been exposed , by increasing the water content of the SC e.g. rubber and plastic gloves , rings water proof adhesives , shoes , boots , clothes and the natural folds of the skin , soft paraffin itself has an occlusive effect .
- 4. Mechanical irritation** – e.g. friction may enhance penetration of chemical and toxic substances .

C. Chemical and physical events or substance – there are different groups of chemical and physical agents , which shows significant differences in absorption and diffusion characteristics , e.g. alkaline solutions have a deleterious action on the horny layer and

promote percutaneous absorption , physical injury e.g. rough sheets produced facial dermatitis in neonates and frictional factors in cases of hand dermatitis .

Clinical features- irritant contact reactions are inflammatory reactions of the skin to an external agent or agents in which , although inflammatory and immunological mediators may be activated . No memory T-cell function or antigen specific immunoglobulin are involved . Irritants produce a wide range of response on the skin , which may range from purely subjective sensation such as stinging , smarting , burning , sensation of dryness and tightness , transient urticarial reactions to more persistent irritant reactions or irritant contact dermatitis . ICD has a spectrum of clinical features , ranging from a little dryness , redness or chapping through various types of eczematous dermatitis to an acute caustic burn .

1. **Chemical burn** – it results when there is irreversible cell damage and necrosis occurs , there is usually rapid onset of painful erythema , often within minutes , at the site of exposure , followed by blistering and the development of necrotic ulcers , wheals may be seen as a result of toxic degranulation of mast cells . Symptoms coincide with the exposure , but with some chemicals , including phenols and weak hydrofluoric acid , the onset may be delayed . Most acids coagulate skin proteins and as a result form a barrier which impedes further penetration . **Alkalis** e.g. NaOH , CaOH , KOH , Na & K cyanides , degrade lipids and saponification of the resulting fatty acids form soaps , which aid penetration deeper into the skin , as a consequence damage is more severe than with most acids and pain is also a feature , the dead skin turns brown and later black , usually without blistering and forms a hard Escher .
2. **Irritant contact dermatitis (ICD)** : The clinical appearance is essentially not different from that due to other causes , allergic or endogenous .
 - a. **Acute irritant contact dermatitis (AICD)** : It is often the result of a single overwhelming exposure to an irritant or caustic chemical or a series of brief chemical or physical contacts , which results in acute inflammation of the skin and usually associated with an immediate sensation of burning or stinging . The initial reaction is usually strictly limited to the site of application or contact , which may be enhanced by occlusion and prolonged duration of application . **Clinically** AICD presented in spectrum , ranging from a mild irritant reaction with transient erythema or chapping to a much more florid dermatitis with edema , inflammation , pain and vesiculation , in more severe cases there may be exudation , bulla formation and tissue necrosis indistinguishable from a chemical burn e.g. cement dermatitis . In patients with accidental or sporadic exposure , the dermatitis usually heals quickly , unless there is skin necrosis .
 - b. **Delayed irritancy** : It is a delayed time course of irritation , which sometimes cause problems in the interpretation of patch test reactions , because the inflammatory

response occurs later (at 48h) and may therefore simulate an ACD, e.g. propylene glycol.

- c. Cumulative irritant contact dermatitis (CICA) chronic ICD /Wear and Tear dermatitis :** It develops as a result of a series of repeated and damaging insults to the skin, which results in break down of stratum corneum barrier and a great number of normally innocuous substances can perpetuate an irritant contact dermatitis. CICA may therefore be due to the summation of various adverse factors, many of which would not in themselves be strong enough to cause ICD. Once CICA develops, any of these minor irritants may also act as perpetuating factors. CICA most commonly affects thin or exposed skin for e.g. the dorsa of the hands, fingertips, the finger's webs, the face and the eyelids in those with cosmetic intolerance or low humidity dermatosis. ICD often begins with a few localized patches of dry, slightly inflamed or chapped skin and the tendency to disseminate is normally less than with constitutional or ACD. Nearly 80% of those with chronic disability dermatitis were found to be atopic. Occupations associated with ICD are hair dressing, medical, dental, veterinary, cleaning, agriculture, horticulture, forestry, food preparation and catering, printing and painting, mental work, mechanical engineering, construction and fishing.
- d. Hand dermatitis (eczema) :** The pathogenesis of hand eczema is often complex. Constitutional irritant and allergic factors frequently coexist, more common in women, as a result of increased irritant exposure rather than an inherent susceptibility, usually there is no pathognomonic single cause. Hand dermatitis that are suggestive of ICD include: ***patchy house –wife type eczema – which affecting principally the dorsa, sides, finger's webs, a ring eczema**, due to wet work and exposure to detergent, usually start as dryness and developing into patchy or diffuse erythema with scaling, fissuring and even vesiculation. However vesicles are less commonly seen in irritant than allergic or constitutional eczema (principally shows dryness or chapping). ***Another common pattern of irritant hand eczema is the "apron" or extended finger tip eczema**, with dryness, redness and fissuring affecting principally the palmar aspects of fingers and distal palm. ***Another form is discoid or nummular hand eczema**, which is rare form of ICD affecting especially the dorsa of the hands or fingers. **D.D. fungal infections, psoriasis and scabies in the interdigital spaces.**
- e. Cosmetic dermatitis :** cosmetics, toiletries and skin care products, including sunscreens, quite frequently cause adverse reactions, in most cases these are only mild or transient and most consumers simply change to an alternative products. In minority, reactions may be more severe, with redness, edema, dryness and scaling, particularly the eyelids, most commonly seen in premenopausal women using many

cosmetic products , which is a form of cumulative cosmetic ICD , allergic contact dermatitis is only excluded by patch test to both products and ingredients .

- f. **Volatile air borne ICD** – both irritant as well as allergens may cause volatile CD , not infrequently cause eyelids dermatitis , for e.g. fumes of acids , alkalis , solvents , resins or any other irritant chemicals , such as ammonia or formaldehyde , irritant dusts of woods , cement , fiberglass or rook wool ,, metal and metal salts .
 - g. **Cheilitis** – is a common problem , atopic eczema , lip licking ICD , cosmetic and medication ACD .
 - h. **Napkin (diaper)** – peristomal and perianal dermatitis : It is an ICD results from prolonged or too frequent contact with degraded urine or faeces /faecal residues , sweat , occlusion , irritant cleansers , secondary infection and secondary medicament allergy are all additional complicating factors . It occurs in infancy and in elderly in situations of urinary or facial incontinence , and may be complicated by secondary bacterial or candidal infection . Perianal dermatitis may occur as a result of mucus or faecal leakage , that occurs in association with haemorrhoids and /or poor sphincter function , a similar condition with peristomal dermatitis .
- 3. Non-immune contact urticaria** : it is an immediate contact reaction occurs without prior sensitization , the reaction remain localized and may present as a transient erythema or as an urticarial wheal and flare , e.g. benzoic , sorbic , cinnamic acids , nicotine acid esters , alcohols , arthropods .
- 4. Symptomatic (subjective) irritant responses** : With some irritants the individuals complain of a subjective sensation of stinging , burning or smarting , these sensory symptoms are not limited to **chemical exposure** , woolen **garments** , **mechanical irritation** , also may cause these symptoms . It is divided Into :
- a. Immediate –type stinging – it is a painful sensation occurs within seconds of contact with the chemicals , like acids , which may be a prodrome to the development of more sever Cutaneous damage . Other substances like chloroform and methanol causes only stinging with out skin damage , this sensation abates quickly following the removal of irritant substance .
 - b. Delayed-type stinging – typically there is no immediate stinging , but discomfort develops within 1-2min. , reaches a maximum in 5-10min. and fading slowly over the next half hour e.g. sunscreen and insect repellent . The sensation dose not correlate with a predisposing to irritant dermatitis or non-immune contact urticaria .

Common and specific irritants :

- *Water an wet work , e.g. sweating under occlusion .
- *Household cleaners , e.g. detergents , soap , shampoos and disinfectant .
- *Industrial cleaning agents , including solvents and abrasives .
- *Alkalis , including cement .

- *Acids – pesticides , raw food , animal enzymes and secretions .
- *Cutting oils – e.g. desiccant powders , dust , soil .
- *Organic solvents .
- *Oxidizing agents .
- *Reducing agents .
- *Certain plants .

Diagnosis- ICD is essentially a clinical diagnosis based on knowledge of the nature and condition of an individuals exposure in the context of their dermatitis . ACD always needs to be excluded by patch test .

Management :

1. Chemical burns – initially it requires irrigation with large volume of lukewarm water , if the chemical is insoluble in water a soap solution may be used instead . High pressures should not be used , to avoid splashing other areas of the body , specific antidotes can be used e.g. 2.5% calcium gluconate gel for hydrofluoric acid , ulcerated areas should be managed by topical antibacterial agents to prevent secondary infections . Don't forget the risk of systemic toxicity from absorption as with chromic acid .

2. ICD – the successful management requires both : a. **Prevention** and b. **Treatment of dermatitis if developed** .

a. Prevention – includes :

A. Avoidance – e.g. mechanization is used to avoid exposure to wet or irritant work will help to reduce the incidence of ICD .

B. Protection – which includes :

1. Personal protective equipment e.g. gloves in hair dressers (unprotected wet work for greater than 25days was the most significant risk factor for the development of dermatitis .
2. Topical preparations e.g. **barrier creams (W/O as ointment against aqueous irritant or O/W as cream against lipophilic materials) , emollients or hand creams (to prevent dryness or chapping of the skin and then subsequent dermatitis) , soap substitutes , avoidance of brushing of hands for surgical procedures** .

b. Treatment – once dermatitis present , it requires palliation of symptoms with topical steroids and emollients . It has been suggested that conditions in which the lamellar body secretary system is impaired or immature e.g. radiation dermatitis , sunburn , ICD due to some surfactants and retinoid and premature infants of less than 33weeks gestation) , should be treated with non-physiological lipids (damaged lipid metabolism) e.g. **petrolatum** . **Whereas** most other causes of ICD , where lipid metabolism has not been damaged (e.g. diaper dermatitis) , should be treated with a mixture of cholesterol : ceramides : free fatty acids , in a 3:1:1 ratio , to achieve most rapid return to normal barrier function .

In sever cases , phototherapy or systemic drugs such as **azathioprine and cyclosporine** , may be required . Where there is secondary infection , topical or systemic antimicrobial agents may be necessary .

3. Non-immune contact urticaria – is treated by non-steroidal anti-inflammatory drugs and UV light , but not by antihistamines .

Prognosis- the previously irritated skin returned to normal after 5weeks , prolonged duration of exposure to irritant substance results in prolonged recovery (e.g. 3weeks induration requires 10weeks for recovery) . **Atopic individuals** have a worse prognosis , a change of job may be helpful if under taken early , **delay in diagnosis** and assessment worsens the prognosis . **The use of** inappropriate cleansers will also affect a patients overall prognosis and outcome .

11% of individuals with ICD developed what is called persistent post occupational dermatitis , which even if the original cause has been eliminated , this condition will persist .

Allergic contact dermatitis (ACD):-

Definition- it is one type of exogenous eczema , caused by exposure to an sensitizing substance (allergen) , may be acute , sub acute or chronic on clinical base .

Prevalence- of ACD through the world accounts for 4-7% of all dermatological consultations (skin diseases) , In Iraq (Diyala) , CD accounts for 10% of all skin diseases and 49% of all dermatitis , 15% of which is ACD and 34% is ICD . **Dermatitis** accounts for almost half of all reported cases of occupational diseases . Over 20% of females will suffer from hand eczema at some stage in their lives . The prevalence of ACD in the European countries is variable from 1.7%in Sweden to 28%in Germany and 15.2% in Denmark .

Pathogenesis- there are two main processes :

- 1. Sensitization (induction , or afferent limb of sensitivity)** – the immunology of ACD is a delayed –type or cell –mediated immunity . It is the primary event which take place before clinical expression of dermatitis . This process is initiated by binding of allergen to skin associated with major histocompatibility complex (MHC) class-2 molecules , either directly via **antigen-binding sites** , in groove of the MHC class-2 molecule on antigen-presenting cells (APCs) , these MHC class-2 molecules are coded on the human leukocyte antigen (HLA) –D region genes and are present on epidermal dendritic cells and Langerhans cells . This process is called **cell stress (develop within 6ho)** , which result in release of co-factors (IL-1B, TNF-alpha , GM-CSF) , which are required for the activation , maturation and migration of Langerhans cells , travel via the afferent lymphatic to the Para cortical areas of the regional lymph nodes , which result in activation of CD4 (T-helper cells) and CD2 (T-effector lymphocyte) ,

with release of many mediators or cytokines (e.g. IL-1 by APCs and IL-2 by **T-lymphocytes**) . These cytokines cause **proliferation and dissemination of sensitized T-lymphocytes , with blast formation in the lymph node** and proliferation of antigen-specific cytotoxic CD8(Tc1) and also CD4(Th1) lymphocytes . The type of T-cell response generated is dependent on the pathway by which the antigen is processed : **small lipid-soluble molecules** such as **urushiol** enter the cytoplasm and presented on MHC class -1 as an endogenous antigen , **polar haptens** are more likely to be presented on MHC class-2 as an exogenous antigen . The process of sensitization in most subjects developed and accomplished with in 5-25days of exposure to allergen (called 'late' reaction) .

- 2. Elicitation** – if a sensitized person is re-exposed to a specific allergen in sufficient concentration , the clinical reaction subsequently develops much more quickly , usually within 24-48ho , however depending on the *degree of sensitivity ,*penetration and *other factors , this may vary from a few hours to many days . Some times a sensitive person might react to substances of related chemical structure , a phenomenon later termed '**cross-sensitization**' , some sensitizer only provoke a reaction if activated by light (photo allergic dermatitis) .

Predisposing factors:

1. Individual factors :