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Psoriasis and Diabetes

Ermira Vasili, Migena Vargu, Genc Burazeri,
Katerina Hysi, Elna Cano and Brikena Bezati
University Hospital Center "Mother Teresa"/ Dermatology-Venerology, Tirana, Albania

1. Introduction

The term "Diabetes mellitus" encompasses a heterogeneous group of disorders characterized by insulin hyposecretion and/or insensitivity.
Type 1 DM is a chronic autoimmune disease associated with selective destruction of insulin-producing pancreatic b-cells. A variety of gene loci have been studied to determine their association with type 1 DM. The early studies suggested that the B8 and B15 of HLA class I antigens were increased in frequency in the diabetics compared to the control group. However, more recently the focus has shifted to the class II HLA-DR locus. It was found that DR3 and DR4 were more prevalent than HLA-B in type 1.DM than HLA-B. The nature of autoantigen(s) responsible for the induction of type 1 DM is unknown. The identification of autoantigens in type 1 DM is essential both for diagnostic purposes and for potential immunotherapeutic intervention in the disease process.
Type 2 DM has a greater genetic association than type 1 DM. The 100% concordance rate in identical twins is thought to be overestimated, due to a selection or reporting bias. A population based twin study in Finland has shown a concordance rate of 40%. Environmental effect may be a possible reason for the higher concordance rate for type 2 DM than for type 1 DM. Perturbations in glucose metabolism due to insulin resistance are further exacerbated when insulin production is compromised.Insulin resistance is a characteristic feature of most patients with Type 2 diabetes mellitus.Several cross-sectional studies in non diabetic subjects on the general population or in individuals with impaired glucose tolerance (IGT)/impaired fasting glucose (IFG) have confirmed that acute-phase reactants such as CRP (and sometimes the cytokines IL-6 and TNF-α) are positively correlated with measures of insulin resistance/plasma insulin concentration, BMI/waist circumference, and circulating triglyceride and negatively correlated with HDL cholesterol concentration. In general, increasing components of the metabolic syndrome in individuals are associated with higher levels of inflammatory markers.
In subjects with IGT or IFG, IL-6 but not TNF-α appears to be elevated compared with individuals with normal glucose tolerance and in one study, inflammatory markers were related to insulin resistance but not to insulin secretion .
Psoriasis is a chronic inflammatory disease of the skin, scalp, nails, and sometimes joints that affects 1-2 percent of the general population.Psoriasis is a clinical diagnosis. The disease is characterized by erythematous and indurate plaque which usually are covered by thick silvery white scales and can manifests as psoriatic arthritis (PsA), an inflammatory joint

disease resulting in extensive bone resorption and joint destruction. Although the clinical course of psoriasis is highly variable between individuals, the lesions are typically recurrent. The aim of this study is to define the linkage between psoriasis and diabetes.There has been performed a retrospective study (cross- sectional study). The data used in this study were obtained from the University Hospital Center "Mother Teresa" in Tirana. Being the only University Hospital Center, it admits as well patients from other districts of Albania. Clinical files of the patients from moderated to severe psoriasis, hospitalized in the dermatology clinic during the period 2000-2010, have been examined. Control group are been considered other hospitalized non psoriasis cases in this hospital center. Both groups had its glycemia values recorded..T-test (student test) was used to compare the continuous variables while the statistical analysis was performed by using SPSS software.

2. Genetics of psoriasis

Associations between psoriasis and particular HLA types have been recognized for nearly 30 years. Henseler and Christophers defined type I psoriasis as having age of onset younger than 40 years, with strong HLA associations. Patients with type II disease were characterized by age of onset 40 years or older, and much weaker HLA associations Patients with type I disease showed a much stronger tendency for familial involvement.The risk ratio for first-degree relatives was approximately 10 for patients with type I psoriasis, but only about 1 to 2 for those with type II psoriasis.

The HLA associations identified in the study of familial psoriasis by James T et al. are very similar to those identified in previous case-control studies of HLA association in psoriasis.In particular, strong associations with HLA-Cw6 and HLA-B57 were found. Approximately two thirds of the psoriatic patients in those earlier studies had a family history negative for psoriasis and could be assumed to represent sporadic cases. The similarity of the HLA associations obtained in pedigree and case-control studies implies that so-called sporadic psoriasis must also have a genetic basis. Because no other inflammatory disease manifests such a strong HLA-C association, it suspect that the MHC psoriasis gene is a disease-specific gene.

The study of Houglin Wang et al confirmed that a locus on chromosome 10, drives the development of psoriasiform skin disease as well as arthritis in the presence of low expression of the common chain of β2 integrins (CD18).They show that a congenic strain containing the 9-cM PL/J element on chromosome 10 (D10mit126 to D10mit194), designated as chromosome 10B PSD1 congenic strain, on the resistant C57BL/6J CD18hypo background developed psoriasiform skin disease, and most notably also a severe arthritis of joints. The PL/J background in the presence of low CD18 expression drives the development of psoriasiform skin disease but rarely in combination with arthritis.

In contrast, the two produced congenic strains harboring fragments telomeric and centromeric of the 9-cM PSD1 fragment (chromosomes 10A and 10D) did not develop the psoriasiform skin disease and/or arthritis within an observation period of 10 mo. These data indicate that a gene (or genes) within the PSD1 locus contribute(s) to pathogenic events common to the psoriasiform skin disease and arthritis in this context under the condition of low expression of CD18.

Since the chromosome 10C mice, congenic for a larger fragment of the chromosome 10 including the PSD1 locus, developed a phenotype identical to the PSD1 congenic (chromosome 10B), they conclude that the PSD1 locus is the major locus within that region.

It is estimated that approximately 40% of individuals suffering from psoriasis or psoriatic arthritis
(PsA) have a first-degree relative who has the disease. In addition, concordance rates as high as 70% have been reported among identical twins. Given the strong genetic component of psoriasis, patients who have psoriasis are often concerned about the heritability of the disease. Family studies indicate that if both parents have psoriasis then the offspring have a 50% chance of developing the disease; if only one parent has psoriasis then the risk for a child to develop psoriasis is 16%. If neither parent is affected but a child develops psoriasis then his/her siblings have an 8% risk for developing the disease. Men have a higher risk for transmitting psoriasis to offspring than women, likely because of genomic imprinting, which is an epigenetic effect that causes differential expression of a gene depending on the gender of the transmitting parent .Because genetics are immutable, modifiable environmental risk factors for psoriasis are of special interest. Further efforts to identify the long –sought gene/genes involving in the pathogenesis of psoriasis continue.

3. Risk factors

There are several risk factors that may provide the environmental stimulus for T-cell proliferation leading to the development of psoriasis. They include psychological stress, certain medication such as antimalarial drugs, beta blockers , lithium and non steroidal, anti-inflammatory drugs ,a history of skin infection, obesity ,smoking and alcohol consumption .

3.1 Stessful like events (psychological stress)

The recognition of psychological needs in patients with psoriasis is critical for managing the condition. Psoriasis can have a substantial psychological and emotional impact on an individual, which is not always related to the extent of skin disease. There are elevated rates of various psychopathologies among patients with psoriasis including poor self-esteem, sexual dysfunction, anxiety, depression, and suicidal ideation.
In different studies (most of them are retrospective) from about one third to about three fourth of psoriatics believed that there was a stress worsening of their psoriasis.The results of an other study do not indicate a major significance of stress for plaque psoriasis patients. But this was a small study. The clinical severity of psoriasis may not reflect the degree of emotional impact of the disease. Still it cannot be ruled out that stress may be an important factor for some psoriasis patients.

3.2 Smoking

An increased prevalence of smoking among patients with psoriasis has been observed in numerous countries including Finland, Italy, the United Kingdom, Norway, China, and the United States. Cigarette smoking has been shown to correlate with increased disease severity and increased mortality in causes of death related to smoking in patients with psoriasis.
In a study, 35 patients who smoked more than 10 cigarettes per day had more severe psoriasis affecting both forearms, hands and feet compared with non smokers (all $P<0.05$). Studies have proposed different mechanisms that could link nicotine to psoriasis, including the enhancement of pro-inflammatory cytokines and altered morphology and functionality of leukocytes.

3.3 Alcohol consumption

Multiple studies have shown that increased alcohol use, and in some cases, abuse, are independent risk factors for psoriasis.A positive dose-response relationship between alcohol intake and psoriasis severity in women was seen in one prospective questionnaire-based study.

Several studies have evaluated the link between psoriasis and alcoholism. However , further study is needed to determine whether an increase in alcohol consumption is a primary risk factor for the development of psoriasis ,or whether alcohol abuse is a secondary factor related to psychosocial rejection that some psoriasis patients may experience.

3.4 Obesity

Over the last decade, studies showed a chronic condition of mild inflammation caused by obesity, with high levels of TNF-α, IL-6, and C-reactive protein associated with an increase of BMI. Obesity could play a role in the development of psoriasis, based on the pro-inflammatorystate it provokes. Or perhaps it could be a consequence of psoriasis, caused by metabolic deregulations induced by the pro-inflammatory state, associated with a poor quality of life and inadequate food habits of the disease carrier.

3.5 Medication

Psoriasis and psoriasiform eruptions have also been associated with use of other antihypertensive such as angiotensin II (AT II) antagonists, calcium channel blockers (CCBs) or clonidine.

Beta-blockers and ACE inhibitors are widely used drugs for the treatment of hypertension, a disease which has been associated with psoriasis, but there is no consensus on the mechanism by which beta-blockers might induce such a reaction.

3.6 Infections

Microorganisms have been associated to the development of psoriasis. β-hemolytic streptococcal infections are linked to the development of guttate psoriasis and intercurrent infections have been associated to pustular psoriasis flares. Streptococcal antigens have been reported, suggesting an autoimmune component in the disease. Protective immunity against streptococci is therefore likely to be dependent on both CD4+ and CD8+ T cells. It is of interest, in this context, that both CD4+ and CD8+ T cells isolated from psoriatic skin lesions have been shown to be respond to crude streptococcal antigens.

4. Imuno-pathogenesis of psoriasis

Despite its unknown etiology, there have been break throughs in the understanding of the immunopathogenesis of psoriasis in recent years. It is now almost certain that psoriasis is a T-lymphocyte mediated inflammatory dermatosis with hyper-proliferation of keratinocytes in genetically predisposed subjects.

At the cellular level, psoriasis is characterized by markedly increased epidermal proliferation and incomplete differentiation; elongation, dilatation and “leakiness” of the superficial plexus of dermal capillaries; and a mixed inflammatory and immune cell infiltrate of the epidermis and papillary dermis.

It is now believed that the clinical phenotype of psoriatic skin arises from the interplay between inflammatory cytokines and cells that make up the cutaneous microenvironment (ie, lymphocytes, antigen-presenting cells [APCs], endothelial cells, and keratinocytes).

Th1 lymphocytes have been identified as a primary source of inflammatory cytokine production in psoriatic skin; regulatory T cells, which normally suppress effector T-cell activity, are dysfunctional in the blood and skin of patients who have psoriasis; and recently identified Th17 cells produce the cytokine interleukin (IL)-17, which is critical to the establishment and maintenance of autoimmunity, and IL-22, which is primarily involved in the process of epidermal differentiation and hyperproliferation. APCs (ie, plasmacytoid and myeloid dendritic cells) and endothelial cells lining the dermal microvasculature have also been shown to play a role in psoriatic disease. In particular, dermal dendritic cells have been shown to contribute to the production of Th1 cytokines (such as IFN-α ,TNF-α and IL-2)and the recruitment of inflammatory cells into psoriatic plaques. The production of IL-20 and IL-23 by myeloid dendritic cells has been reported to promote keratinocyte proliferation, up-regulate inflammatory gene products, and stimulate T-cell activation, all of which contribute to psoriatic lesions. Endothelial cells play a critical role in recruiting inflammatory cells through their expression of E-selectin, which enhances the homing of cutaneous lymphocyte-associated antigen- positive T cells into the skin. Angiogenesis is stimulated by the inflammatory process and studies demonstrate that circulating levels of vascular endothelial growth factor correlate with psoriasis activity.

5. Psoriasis and comorbidities

The multiaspect nature of psoriasis as a systemic disease associated with numerous multiorgan abnormalities and complications has been recognized.
Many epidemiologic studies with varies designs link psoriasis to systemic metabolic co-morbidities. Psoriasis and its comorbidities share a common etiological linkage, it is hypothesized that proinflammatory cytokines contribute to dyslipidemias, atherogenesis, peripheral insulin resistance, type II diabetes, hypertension etc.

5.1 Cardiovascular risk in patients with psoriasis

Several studies have demonstrated that cardiovascular diseases and their associated risk factors are more common in patients with psoriasis than in the general population. The cause of this elevated risk is unclear. Severe psoriasis is associated with an increased prevalence of metabolic syndrome. Metabolic syndrome is generally defined by the presence of or treatment for at least three of the following five criteria: hypertension, insulin resistance, decreased high-density lipoprotein, hypertriglyceridemia, and central obesity.
Mallbris et al. performed a historical cohort study to assess the risk for cardiovascular mortality among psoriasis patients. These data suggest on the one side, that psoriasis patients with more severe disease have a substantially increased risk for cardiovascular death. On the other side, it can be argued that the available in-hospital treatment modalities contribute to this risk as well.
The increased risk of MI and vaso-occlusive disease was attributed to the increased prevalence of risk factors in psoriatic patients including lifestyle factors such as smoking and alcohol abuse. Evolving research suggests that the chronic inflammatory nature of psoriasis itself may lead to adverse health outcomes, including coronary artery disease and myocardial infarction (MI).
Several cytokines that have been identified as important mediators of psoriasis, such as interleukins 1, 4, 6, 8, 12 and tumor necrosis factor-α , have also been identified in metabolic syndrome, a chronic inflammatory state associated with obesity. Given the link between atherosclerosis and inflammation ,the risk of cardiovascular disease is likely to be increased in patients with psoriasis.

Psoriasis and atherosclerosis may have certain common underlying pathogenic mechanisms.A separate prospective study demonstrated an increased relative risk for myocardial infarction compared to healthy controls; this increased risk was greater in younger patients with mild or severe psoriasis, compared to older patients with similar severity of disease.

Epidemiologic studies show that atherosclerosis has a number of causal risk factors, several of which(Cigarette smoking, atherogenic lipids, hypertension, and hyperglycemia) involve cytokines, other bioactive substances, and cells characteristic of the inflammatory process.

Gelfand JM, et al.54 had conducted a population-based cohort study using data collected by general practitioners participating in the General Practice Research Database in the United Kingdom from 1987- 2002. A total of 556,995 control patients and patients with mild (n = 127,139) and severe psoriasis (n = 3,837) were studied, and controlled for traditional cardiovascular risk factors (diabetes mellitus, history of myocardial infarction (MI), hypertension, hyperlipidaemia, smoking). They found that the adjusted relative risks of MI are 1.54 (1.24–1.91) and 7.08 (3.06-16.36) respectively in mild and severe psoriasis as compared with controls.

Diabetes and related metabolic diseases, such as hyperinsulinemia, insulin resistance, and central obesity, are recognized as major contributors to cardiovascular morbidity and mortality. Psoriasis is known to be associated with several lifestyle factors such a smoking, obesity and diabetes that per se may increase the risk of cardiovascular morbidity.

5.2 Obesity and diabetes in patients with psoriasis

Psoriasis has a complex relationship with metabolic diseases such as obesity.

Studies have shown that, compared with the general population , patients with psoriasis are more frequently overweight (25≤BMI<30) or obese (BMI>30).

Adipose tissue, including adipocytes and resident macrophages, may serve as a significant source of TNF-α. TNFa is a pro-inflammatory cytokine that amplifies inflammation through several distinct pathways: facilitating entry of inflammatory cells into lesional skin through induction of adhesion molecules on vascular endothelial cells; stimulating keratinocyte production of other pro-inflammatory mediators.

Risk for psoriasis has been shown to increase with increasing BMI (P=0.001). This pro-inflammatory state in obesity may explain the association between psoriasis and obesity and these proinflammatory cytokines might also influence the course and presentation of psoriasis. .In a study performed by Halla M. Ragab et al., with increase of the severity of the disease, these cytokines are significantly elevated in severe psoriasis patients than in mild to moderate one which is attributed to the role of these cytokines in the pathogenesis and progress of psoriasis and their elevation is responsible for the development, maintenance and resolution of psoriatic lesions. When patients with psoriasis are more likely to be obese that implies they will also have the comorbid conditions of those with obesity. The risks of diabetes, hypertension and dyslipidemia start to rise from a BMI of about 21.0 kg/m2 there by deteriorating the cardiovascular risk profile.

Inflammation plays a role in the pathogenesis of some glucose disorders in adults.Obesity has genetic as well as environmental causes. It has a strong effect on the development of type 2 DM, as it is found in western countries and some ethnic groups such as Pima Indians. Obesity is more than just a risk factor, it has a causal effect in the development of type 2 DM against a genetic background. The evolution from obesity to type DM results from a succession of pathophysiological events: (a) augmentation of the adipose tissue mass, leading to increased lipid oxidation; (b) insulin resistance noted early in obesity, revealed by

euglycemic clamp, as a resistance to insulin mediated glucose storage and oxidation. Blocking the function of the glycogen cycle; (c) despite maintained insulin secretion, unused glycogen prevents further glucose storage leading to type 2 DM; (d) complete b-cell exhaustion appears later.

Also, studies have reported a high prevalence of diabetes among patients with psoriasis. Joshua Barzilay (Tucker, GA) reviewed the association of markers of inflammation with diabetes. Inflammation is strongly related to insulin resistance, although the question of whether treatment directed at the inflammatory process could lead to benefits, such as decreasing the development of diabetes, has yet to be answered.In a study of 200 patients with psoriasis at an Italian clinic reported that 41.5% had diabetes compared with 24.3 % of controls (n=280; P< 0.001). Of note, 36.7% of psoriasis patients younger than 50 years of age (n=117) had diabetes (P< 0.001). Studies have shown that patients with psoriasis have higher rates of impaired glucose tolerance compared with controls(all P<0.05).

5.3 HTA in patients with psoriasis

Several epidemiologic studies have shown that hypertension is a common comorbidity in patients with psoriasis. An increased risk of hypertension of 1.2- to 2-fold has been reported in cross-sectional studies.

As mentioned above, psoriasis is a chronic inflammatory disease, and inflammation is a risk factor for hypertension. Systemic treatments in psoriasis reduce the cardiovascular risk by diminishing the inflammation, but it should be taken into account that most therapies also have adverse cardiovascular effects like dyslipidemia, hyperhomocysteinemia and hypertension.

6. Results of the study

This study covered 599 psoriatic patients (3-80 yrs old) and 599 cases of control group (3-85 yrs old). The age average for both groups varies in 49.64, with a SD value= 19.179 and median value of M=53.00. (Tab.1,2,3)

Grupi

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Kontroll	599	50.0	50.0	50.0
	Psoriasis	599	50.0	50.0	100.0
	Total	1198	100.0	100.0	

Table 1. Frequency

Seksi

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	M	711	59.3	59.3	59.3
	F	487	40.7	40.7	100.0
	Total	1198	100.0	100.0	

Table 2. Seksi

The mean glycemia value for both groups was in the value 105.31 with a Standard Deviation value of 38.641 and median value of M= 96.00

Statistics

		Mosha	Glicemia
N	Valid	1198	1198
	Missing	0	0
Mean		49.64	105.31
Median		53.00	96.00
Std. Deviation		19.179	38.641

Table 3. Statistic

The outcome of the statistical analysis for both groups provided a mean value of glycemia in the control group of 106.98±41.700 and in the psoriasis group of 103.64±35.275 (Tab.4)

Group Statistics

	Grupi	N	Mean	Std. Deviation	Std. Error Mean
Glicemia	Kontroll	599	106.98	41.700	1.704
	Psoriasis	599	103.64	35.275	1.441

Table 4. Group Statistic

T-Test equality outcome showed that there is no statistical significant difference (considerable) in glycemia values between psoriatic group and control group (P=0.134). (Tab.5)

Independent Samples Test

		t-test for Equality of Means						
							95% Confidence Interval of the Difference	
		t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Glicemia	Equal variances assumed	1.498	1196	.134	3.344	2.232	-1.034	7.722
	Equal variances not assumed	1.498	1164.005	.134	3.344	2.232	-1.035	7.722

Table 5. Independent Samples Test

7. Discussion

7.1 Are psoriasis and diabetes linked?

Psoriasis and diabetes have a certain common underlying pathogenic mechanisms. Both have an inflammatory nature and both are associated with T-lymphocite –mediated adaptive immune events and mechanisms, involving innate immunity. Specifically, both psoriasis and diabetes are associated with T-helper.

Th-1 inflammatory cytokines such as TNF-a are elevated in the skin and blood of patients with psoriasis and diabetes .(table-.6) Similarly, TNF-a is secreted in adipose tissue and is an important feature of the chronic low level inflammation seen in obesity Insulin resistance, which is common to psoriasis and the metabolic syndrome, may be mediated in part through inflammatory cytokines such as TNF.

The adipocyte is another important component of inflammation. Adipose tissue secretes inflammatory cytokines such as TNF-α and IL-6, and CRP levels increase with increasing

weight.A new conceptis that obesity leads to macrophage infiltration of adipose tissues, perhaps because of the action of factors produced by adipocytes themselves, with macrophages rather than adipocytes producing some of the typically measured inflammatory cytokines. In this view, macrophages may produce factors such as TNF-α, causing insulin resistance, while both macrophages and adipocytes produce factors that increase hepatic CRP synthesis, such as IL-6.9 (Table-6).

Other cells and biologically active molecules (including cytokines, chemokines, adipokines) that are implicated in the pathogenesis of both psoriasis and diabetes are listed and referenced in Table 6.

A major problem limiting our understanding of the genetic basis of type 2 diabetes is that many environmental and genetically based factors influence insulin sensitivity and insulin secretion: these include age, gender, ethnicity, physical fitness, diet, smoking obesity, and fat distribution.

The prevalence of obesity, diabetes, and metabolic syndrome has been shown to be increased in psoriasis patients in the general population. At least one study has demonstrated a higher prevalence of diabetes in patients who have psoriasis independent of traditional diabetes risk factors such as age, gender, obesity, hypertension, and hyperlipidemia, indicating that the disease itself, or possibly its chronic treatments, may predispose to the development of diabetes.

As early as 1950's, there was epidemiological evidence suggesting a correlation between inflammation and insulin resistant states such as obesity, but the mechanistic links were unknown. In the last decade, however, it has become increasingly evident that obesity and the concomitant development of inflammation are major components of insulin resistance. Studies in human obesity and insulin resistance have revealed a clear association between the chronic activation of pro-inflammatory signaling pathways and decreased insulin sensitivity. For example, elevated levels of tumor necrosis factor-α (TNF), interleukin-6 (IL-6) and interleukin (IL-8) have all been reported in various diabetic and insulin-resistant states . We noticed a non significant difference in the glycemia values of our study of the psoriasis group vs non-psoriasis group. However it has to be pointed out that this study has not taken into consideration other factors like for instance obesity, fat level, HTA which play an important role in insulin resistance. In a cross-sectional study (performed by Reynoso-von Drateln et al.) on lipids profile, insulin secretion and insulin sensitivity at psoriatic patients it resulted that : high – density lipoprotein cholesterol was significantly decreased in patients with psoriasis (p=0.2) .There were no significant differences in insulin secretion or sensitivity in patients with psoriasis compared with control patients.

The relationship between systemic treatment of psoriasis and CVR factors has not been adequately studied; however, in rheumatoid arthritis and psoriasis, systemic treatment with methotrexate has been shown to decrease vascular risk.Methotrexate (MTX) is a frequently prescribed agent.MTX blocks DNA synthesis in; rapidly proliferating epidermal cells, T- and B-lymphocytes and disrupts cytokine secretion.

In our psoriasis patient group, the most applied therapy has been the one with Methotrexate and UV phototherapy due to the fact that the psoriasis encountered cases has been between middle and high degree.

UV irradiation induces a degree of systemic immunosuppress mediated via a number of mechanisms possibly including production of Th2 cytokines interleukin(IL-4) and (IL-10). UV-induced vitamin D production may also reduce risks for atherosclerosis in several ways including augmentation of IL-10 and downregulation of TNF-α, C-reactive protein and IL-6 production.

	Psoriasis	Diabetes
Cytokines		
IL-2	+	+
IL-1	(no)	+
IL-4	(no)	+
IL-5	(no)	+
IL-6	+	+
IL-10	(no)	+
IL-13	(no)	+
IL-15	+	(no)
IL-17	+	(no)
IL-18	+	(no)
IL-20	+	(no)
IL-23	+	(no)
IFN-α	+	+
IFN-y	+	+
TNF-α	+	+
Chemokines		
IP-10	+	+
MCP-1	+	+
IL-8	+	+
Adipokines	+	+
Resistin	+	+
Leptin	+	+
PAI-1	+	+
Adhesion and costimulatory molecules		
ICAM/LFA-1	+	+
VCAM-1/VLA-4	+	+
CD80,CD28	+	(no)
CD40/CD40L	+	(no)
Leucocytes		
Th1	+	+
Th2	+	+
CD4	+	+
CD8	+	+
Monocytes/Macrophages	+	+
Neutrophils	+	+
Other molecules		
CRP	+	+
iNOS	+	+
Oxidized LDL	+	+

CRP, C-reactive protein; IL interleukin; ICAM,intercellular adhesion molecule; IFN interferon; iNOS, inducible nitric oxide synthase; IP-10, interferon-inducible protein 10; LDL, low density lipoprotein; MCP-1 monocye chemotactic protein-1; PAI-1 plasminogen activator inhibitor type 1; TNF-α, tumour necrosis factor-alfa; Th1/Th2, T-helper 1 and T-helper 2; VCAM-1, vascular cell adhesion molecule-1

Table 6. Major inflammatory mediators in psoriasis and diabetes

8. Conclusion

Our study is just an observation. Psoriasis is a very complex pathology both from the pathogenesis it provides as well as the ongoing and the complications that could be encountered. Therefore it is more and more necessary to perform studies on it and on the risks it carries on.

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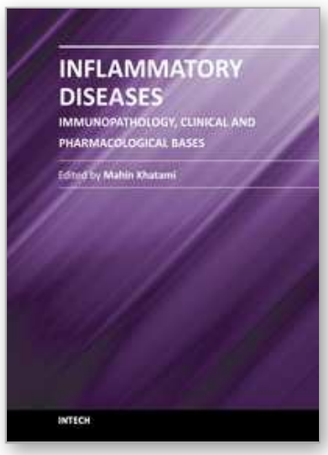

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This book is a collection of comprehensive reviews contributed by experts in the diverse fields of acute and chronic inflammatory diseases, with emphasis on current pharmacological and diagnostic options. Interested professionals are also encouraged to review the contributions made by experts in a second related book entitled "Inflammation, Chronic Diseases and Cancer"; it deals with immunobiology, clinical reviews, and perspectives of the mechanisms of immune inflammatory responses that are involved in alterations of immune dynamics during the genesis, progression and manifestation of a number of inflammatory diseases and cancers, as well as perspectives for diagnosis, and treatment or prevention of these disabling and potentially preventable diseases, particularly for the growing population of older adults around the globe.

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