The Expression of Retrovirus-Like Particles in Psoriasis

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Retrovirus-like particles have been isolated from patients with psoriasis. Antigens crossreacting with the major internal protein, pso p27, of these particles have been demonstrated in the wall of dermal vessels and in a subtraction of cells in psoriatic lesions. The antigen has also been observed in blood lymphocytes from psoriatic patients. Pso p27 antigen and anti-pso p27 antibodies are present as complement-activating immune complexes in psoriatic scale and in the blood of patients with psoriasis and psoriatic arthritis. The potential contribution of the circulating immune complexes to the inflammatory process in psoriasis is discussed. J Invest Dermatol 95:415–435, 1990

The Isolation of Retrovirus-like Particles Subcellular particles, resembling virus particles, detected in psoriatic lesions [1,2], are expressed by in vitro cultivation of blood lymphocytes [3] and epithelial cells [4] from psoriatic patients, and may occasionally be isolated from the urine of patients suffering from extensive psoriasis [5]. The main reason our work is based on the particles obtained from psoriatic urine is that these particles are expressed in vivo. The particles appear as membrane-coated virus particles with surface knobs [4,5]. They have a diameter of about 100 nm and are isolated at a density of 1.17 g/cm³ by sucrose gradient centrifugation [4,5]. Radioactive labeling and sodium dodecylsulphate gel-electrophoresis of purified particles indicate the presence of a surface glycoprotein with a molecular weight estimated at 70 kD (gp 70) and three internal proteins with molecular weights of 27 (p27), 15, and 12 kD, respectively [5,6]. These are all features characteristic of animal retroviruses, but no reverse transcriptase activity or polyadenylated high molecular weight RNA have been detected in the particles [7]. This indicates that the particles are not infectious agents, but may be incomplete endogenous retroviruses [7].

Detection of Particle Antigen in Blood Lymphocytes from Psoriatic Patients and in Psoriatic Lesions When a monospecific rabbit antiserum against the major internal protein, p27, of the urine particles was used in indirect immunofluorescence on blood lymphocytes obtained from patients with psoriasis, the presence of p27 antigen was demonstrated in a subfraction of the lymphocytes (0%–1%), whereas no p27 positive cells were detected among the lymphocytes obtained from healthy controls [8]. Double labeling of the blood lymphocytes with anti-p27 serum and specific antisera for T and B cells showed p27 positive cells among lymphocytes with markers for T and B cells as well as for T cells [8].

Indirect immunofluorescence with the rabbit anti-p27 serum on biopsies taken from psoriatic lesions gave a bright fluorescence in the wall of some of the dermal vessels, at the dermoepidermal junction, in a subfraction of epidermal cells, and in the psoriatic scale, whereas no p27 antigen was detected in skin biopsies taken from healthy controls [9]. Considerable amounts of p27 antigen could also be extracted from psoriatic scales [10].

Isolation of p27 Antigen from Psoriatic Scales (pso p27) The p27 antigen extracted from psoriatic scales has been purified by immunosorbent chromatography using antibodies against the urine particle antigen p27, and gel filtration in guanidine-hydrochloride [11,12]. The molecular weight of this scale antigen is estimated to be 27 kD [11]. To differentiate between the p27 antigen obtained from the urine particles and the p27 antigen obtained from the psoriatic scales, the latter is designated pso p27 [11].

Demonstration of Antibodies Against p27/pso p27 Great amounts of antibodies that bind to the pso p27 antigen as well as to the p27 antigen can be extracted from psoriatic scales [10,11]. The pso p27 antigen and the anti-pso p27 antibodies are shown to be present as complement-activating immune complexes as judged by the generation of complement factor C5a when incubated with rabbit serum [5,11]. C5a is a very potent chemoattractant to granulocytes and probably plays a significant role in the transepidermal migration of granulocytes in the psoriatic lesions.

Insignificant concentrations of free antibodies against p27/pso p27 antigens are found in sera from psoriatic patients and from healthy controls. However, analyses of circulating immune complexes from patients with psoriasis revealed the presence of p27 antigen and anti-p27 antibodies [10].

The Presence of pso p27 Antigen, Immunoglobulins, and Complement Factor C3c in Epidermal Cells and Dermal Vessels in Psoriatic Lesions When antibodies against pso p27 antigen (monoclonal and polyclonal) were used in indirect immunofluorescence on skin biopsies from psoriatic lesions, the pso p27 antigen appeared in a subfraction of epidermal cells and in the wall of some of the dermal vessels, equivalent to the observations made with the rabbit anti-p27 serum [9]. Double staining of the skin lesions for pso p27 antigen and human IgG showed that the pso p27 positive epidermal cells were concomitantly positive for IgG* (Fig 1a, b). The cells were also positive for IgA and complement factor C3c.* This indicates that the pso p27 antigens detected in the epidermal cells are in the state of phagocytized immune complexes. Likewise, the concomitant staining of the wall of some of the dermal vessels in the psoriatic lesions with anti-pso p27 (Fig 1c), anti-human IgG (Fig 1d), C3c, and IgA suggest the presence of pso p27 containing immune complexes.*

The Production of pso p27 Antigen by Blood Lymphocytes, and the Potential Role of These Antigens in the Pathogenesis of Psoriasis About 0.5% of the blood lymphocytes from psoriatic patients are found to be stained with the anti-pso p27 antiserum.*

This is the same frequency found when lymphocytes from psoriatic patients were studied with the rabbit antiserum against the p27 antigen from the urine particles [8]. Double staining with the anti-pso p27 serum and anti-human IgG antibodies showed, in contrast to the cells in the skin lesions, that only a few per cent of the pso p27 positive cells were concomitantly stained with anti-IgG antibodies (Fig 1c, f).

It is tempting to conclude that the pso p27 antigen (or p27 antigen) detected in the blood lymphocytes is produced by these cells, and that this is the source of the p27 antigen found in circulating immune complexes [10]. Furthermore, one may hypothesize that the circulating immune complexes are trapped by the endothelial cells in dermal vessels, perhaps through binding to Fc and C3b receptors. Subsequently, the immune complexes may be phagocytized and transported through the dermis and probably end up in antigen-presenting cells in the epidermis and contribute to the inflammatory process in the psoriatic lesion through activation of T lymphocytes.*

REFERENCES


