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Introduction

As underlying mechanism of solar urticaria, it is supposed that an inactive photoallergen in the skin or serum of patients with solar urticaria (SU) exists. This photoallergen is activated by irradiation, resulting in an immediate type hypersensitivity reaction with urticarial symptoms after sun exposure.¹

We wanted to investigate the existence of such a reactive photoallergen in the pathogenesis of solar urticaria, based on measuring the basophil activation with UV-irradiated serum of solar urticaria-patients and controls.

Materials and Methods

Blood and serum were taken from three young men (18, 21 and 21 years) with solar urticaria, proven by phototesting (Tab. 1.). Blood and irradiated serum from individuals without SU were used as controls.

Basophil activation tests (Flow CAST®, Bühlmann Laboratories AG) were performed to measure the allergen-specific response with UVA (50, 100 J/cm²) and UVB (100, 200 mJ/cm²) irradiated and unirradiated serum of patients and controls (Fig. 1.).

Tab.1: Patients' characteristics

Patients	1	2	3
Age/Sex	21, male	18, male	21, male
History of symptoms	since 6 months	since childhood	since 2 months
Appearance of symptoms after UVA photo-provocation	after 15 minutes	negative	immediate reaction
UVA minimal urticarial dose	5 J/cm ²	negative	10 J/cm ²
Appearance of symptoms after UVB photo-provocation	negative	negative	negative
Reaction after sunlight exposure	n.d.	erythema, face-swelling	erythema, pruritus, urticaria
Reaction after visible light exposure	erythema, pruritus	negative	erythema
Reaction after heat provocation	negative	negative	negative

n.d. = not done

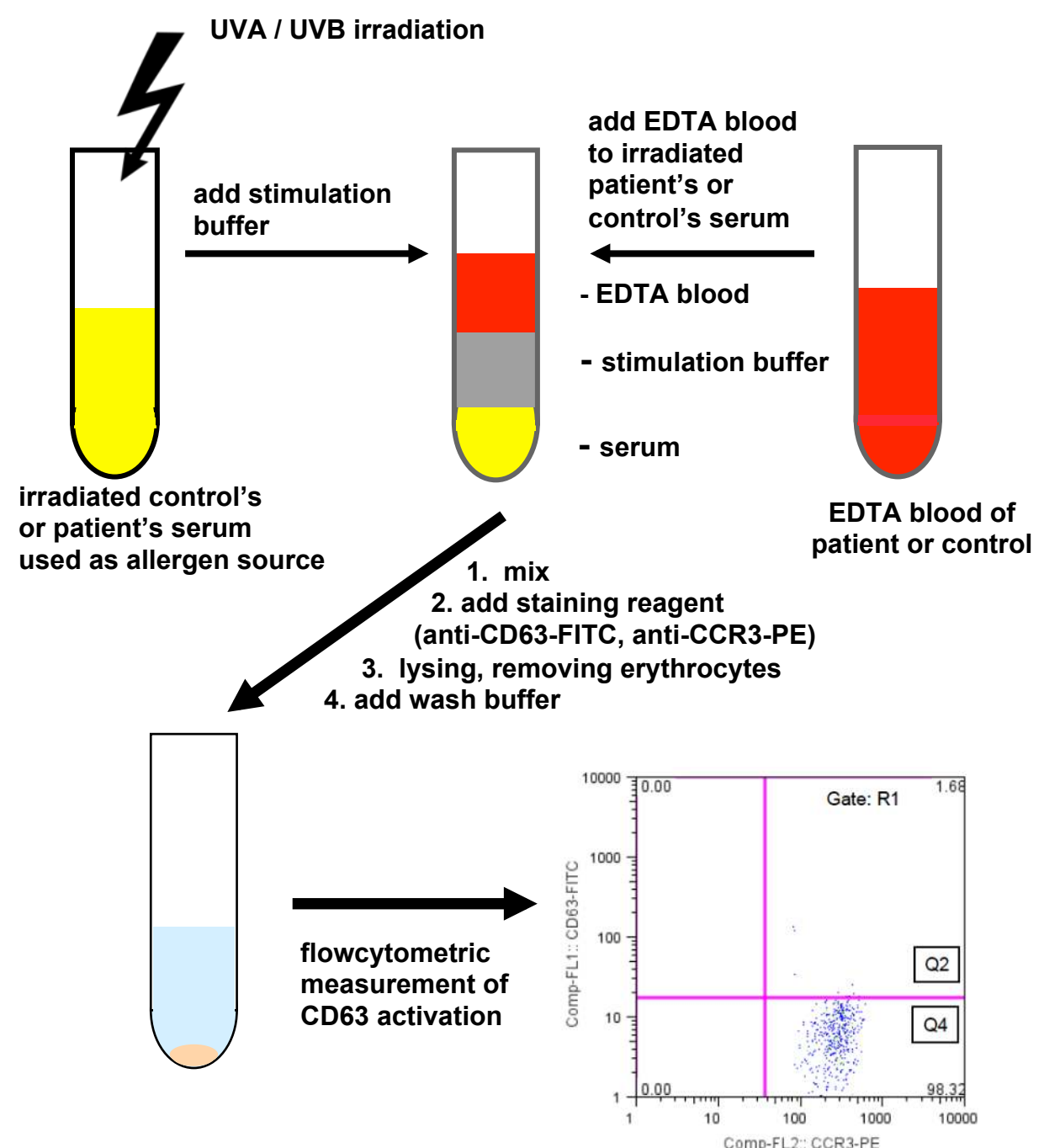


Fig.1: Principle of basophil activation test with irradiated serum

Results: There was no significant CD63 activation of patients' or controls' basophils with the irradiated SU-patients' or controls' serum.

Discussion: Despite positive results in a former case report² (CD203c expression was up-regulated more than 10% in relation to the negative control after irradiation with UVA 40 J/cm²) we were not able to activate basophils of our patients with SU by irradiated serum. We draw the conclusion that a photoallergen could not be detected in our patients by the method used. It is supposed, that there are two types of solar urticaria. In type I there is a pathological photoallergen in the patients' serum and in type II a precursor of the photoallergen in the patients' skin assumed.¹ In our collective it is most likely, that the photoallergen is present in patients' skin, but not in serum. This explains the different outcome of studies with similar tests. Another cause could be that CD63 activation is not as sensitive as CD203c activation of basophils. It is also known that the photoallergen can differ in size and shape, which would explain the individual reaction and outcome. So more detailed information on fundamental pathophysiology of solar urticaria is needed to understand and characterise this complex disease completely.

References

1. Goetze S, Elsner P; Minireview Solar urticaria. JDDG 2015; 13: 1250-1253

2. Stöcker B, Seller N, Brehler R; Solar urticaria: In vitro activation of basophils due to UV-irradiated autologous serum. 9. Deutscher Allergiekongress 2014, Wiesbaden