PRO EXPERIMENTIS

Clinical Investigations on the Relation Between Macromolecular Transport and Chemical Sensitization

Our procedure, based on macromolecular transport by the lymphatic system of the human skin, was submitted to clinical investigations. The tests were performed in the manner described[1]. The patch tests were carried out according to Jadassohn-Bloch. For concentrations and solvents see BURCKHARDT[2]. The following substances were used: (1) turpentine, (2) sublimate, (3) potassium bichromate, (4) formaldehyde, (5) *para*-phenylene-diamine, (6) nickel sulphate, (7) Novocaine, (8) *Oleum rosarum*, (9) soda, (10) industrial spirits, (11) *para*-ethoxy-chrysoidine, (12) diamino-phenol, (13) benzene, (14) lead acetate, (15) thioglycolic acid, (16) iodine, (17) copper chloride, (18) penicillin, (19) sulphonamide, (20) streptomycin, (21) carbon disulphide, (22) Vioform, (23) cement, (24) trichloro-ethylene, (25) coal-tar.

Evaluation of examinations performed on 376 subjects (285 men and 91 women) aged 20–84 years

	Grades (= Types)			
	T_1	T_2	T_3	T_4
Occupation				
Industrial and commercial workers	42	79	54	40
Clerks	19	49	9	39
Agricultural workers	10	23	5	7
Total	71	151	68	86
Purpura allergica	–	–	2	1
Prurigo group	–	2	1	–
Urticaria	8	7	–	2
Quincke's oedema	1	–	–	1
Eczema group (except mycotic dyshidrosis)	25	45	17	7
Mycotic dyshidrosis	4	7	7	–
Other non-allergic diseases (except pemphigus group)	33	90	41	75
Positive allergic anamnesis	25	41	21	10
1–7. Sensitive against one or more chemicals listed under these numbers	25	63	11	∅
8–25. Sensitive against one or more chemicals listed under these numbers	2	2	1	∅

(30 subjects of types T_1, T_2 and T_3 and 20 of type T_4 were examined)

In view of the fact that the four types (T_1, T_2, T_3, T_4) of transport could only be found in subjects over 20 years of age, the individuals examined could be divided according to their age into 2 groups: those over and those under 20.

Patch tests with substances 1–7 were performed on each subject. It was found that the patch-positive individuals – over 20 years – always belong to one of the first three groups (T_1, T_2, T_3), never to the fourth one (T_4). As the application of a greater number of allergens gives more certain information about the allergized state of the subject, the patch test was applied to 20 individuals belonging to the fourth type with the other 18 substances, too, and as control it was also applied to the 30 subjects belonging to the first three types not reacting positively to substances 1–7. The examinations demonstrated again that only the subjects belonging to the three first types were patch-positive. Those belonging to type 4 again gave negative patch tests (see Table). In adults belonging to each of the 4 types in 20-20 patients suffering from allergic and non-allergic diseases of the skin, the transport measurements performed during the illness and after recovery gave identical results.

By comparison of the macromolecular transport and the patch tests, as well as on the basis of the case history of the subjects examined, our test seems suitable for recognizing in individuals over 20 years of age the disposition for sensitization and for performing screening tests.

Zusammenfassung. Die Makromoleküle der am langsamsten transportierenden Individuen reagierten auf die Läppchenproben sämtlich negativ, ein positives Ergebnis wurde nur bei den schneller transportierenden Personen erhalten.

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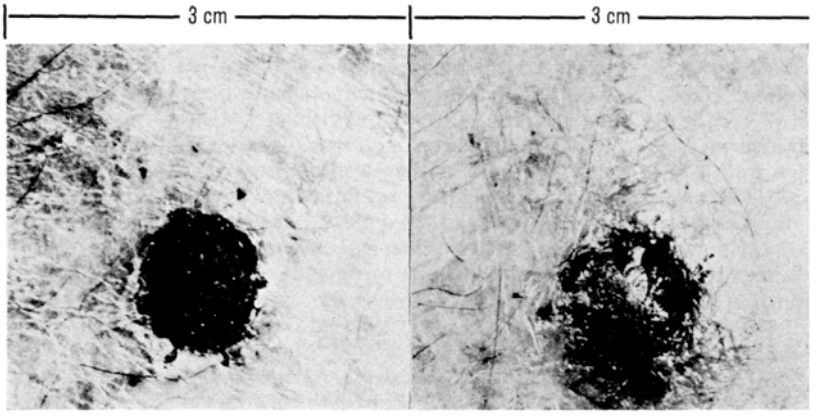
[1] L. FORRÓ and A. NAGY, Exper. *21*, 420 (1965).
[2] W. BURCKHARDT, in A. MARCHIONINI, *Handbuch der Haut- und Geschlechtskrankheiten* (J. JADASSOHN, Ergänzungswerk; Springer, Berlin-Göttingen-Heidelberg 1962), vol. II/1, p. 387.

A New Method: Contribution to the 'Typing Problem' in Homotransplantation

According to the literature, the rejection in the case of homotransplants is a result of an immune reaction. The pathway of the antigen in the organism leads through the lymphatic vessels. If the donors are selected by some method, a prolonged survival could be observed[1–3].

FORRÓ and NAGY[4] demonstrated with their procedure, consisting of an intracutaneous injection, that, from the point of view of macromolecular transport of the lymph apparatus of the skin, adults can be ranged into four groups. By means of this test the donors and acceptors were selected. Among the four groups, homotransplanta-

[1] L. BRENT and P. B. MEDAWAR, Brit. med. J. *2*, 269 (1963).
[2] P. B. MEDAWAR, Bull. War Med. *4*, 1 (1943).
[3] B. R. STARK, Bull. N.Y. Acad. Med. *34*, 561 (1958).
[4] L. FORRÓ and A. NAGY, Exper. *21*, 480 (1965).



Acceptor. K.S., male, 61 years of age. Group T_1. 14 days after grafting on the anterior surface of the leg. a, *Donor.* D.J., male, 42 years of age. Group T_1. Completely necrotized; b, *Donor.* K.J., male, 46 years of age. Group T_4. Implanted, alive.

tions were performed on individuals belonging to two extremes: on those denoted with T_1, having a rapid transport capacity, and on those denoted with T_4 having the slowest transport capacity. Onto the tibial surface of the legs of 5 acceptors (two belonged to type T_1 and the others to T_4) skin grafts were transplanted: onto the one grafts from T_1 and onto the other grafts from T_4 donors. Complete grafts were transplanted. The blood groups of the acceptors and donors were also taken into consideration. The transplantations were observed macroscopically.

It was revealed that the survival of the graft depends on the fact as to which T group the donor belongs; on the other hand, the circumstance as to which group the acceptor belongs is of no consequence. The grafts derived from individuals of group T_4 with the slowest transport capacity survived by 3–21 days those of individuals belonging to the T_1 group with the most rapid transport capacity (Figures 1a and 1b). This was the case in both grafts from subjects belonging to the same blood group and those belonging to different blood groups.

The investigations performed so far suggest that the procedure is suitable for the selection of donors; and, on the other hand, the possibility arises that there is some correlation between the antigen of the graft and the peripheral lymph vessel system.

Zusammenfassung. In Homotransplantationsversuchen wird gezeigt, dass der neu verwendete Läppchentest zur Messung des makromolekulären Transports des Lymphapparates für die Auswahl des Spenders geeignet ist.

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Amperometric Determination of UO_2^{++} as Vanadate

A rapid amperometric method for the determination of UO_2^{++} ions has been described which consists of titrating against sodium *ortho*-vanadate solution at $E_{d.e.} = -0.85$ v (vs. SCE). Uranyl contents down to 0.5 m*M* can be determined with an accuracy of 1%.

In an earlier publication[1] the authors have studied the compositions of uranyl vanadates formed by the interaction of $UO_2(NO_3)_2$ and different sodium vanadates (*ortho*-, pyro-, *meta*-, and poly-) by electrometric techniques; and have concluded that out of three compounds formed, $(2.5\,UO_2 \cdot Na)V_2O_8$, $(1.5\,UO_2 \cdot Na)V_2O_7$ and $(0.5\,UO_2 \cdot Na)V_2O_6$, the precipitation of the first, i.e. $(2.5\,UO_2 \cdot Na)V_2O_8$, is quantitative in a pH range of 5.6–6.5. The purpose of the present investigation is to study the possibility of determining UO_2^{++} ions as $(2.5\,UO_2 \cdot Na)V_2O_8$ amperometrically. There is, however, no reference in the literature to the amperometric study of this reaction.

Anal. R. (BDH) reagents, $UO_2(NO_3)_2$, $KClO_4$, thymol and Merck's (GR) Vanadium pentoxide were used and their solutions prepared in air-free conductivity water. A manual polarograph with scalamp galvanometer as current recorder was employed for amperometric work. A capillary having the following characteristics, $m = 2.416$ mg/sec, $t = 3.58$ sec, and $m^{2/3}t^{1/6} = 2.226$ $mg^{2/3}t^{-1/2}$ was used in conjunction with SCE connected to the cell by a low resistance salt bridge; 20.0 ml of the test solution was taken into the cell each time, deaerated and stirred by bubbling hydrogen.

The standard solution of sodium *ortho*-vanadate was prepared by dissolving a weighed amount of vanadium pentoxide in a boiling solution of NaOH of the required strength.

A series of solutions containing different concentrations of $UO_2(NO_3)_2$, appropriate amounts of supporting electrolyte $KClO_4$ (40–70 times more than UO_2^{++} ions) and $2 \cdot 10^{-4}$% thymol were prepared and titrated with a standard solution of sodium *ortho*-vanadate at $E_{d.e.} = -0.85$ v (vs. SCE), which is the limiting current plateau potential

[1] M. L. Mittal and R. S. Saxena, J. Nucl. inorg. Chem., in press (1964).