EXPERIMENTAL TRANSFUSION IN RABBITS, GUINEA-PIGS, RATS, AND MICE OF SYSTEMIC LUPUS ERYTHEMATOSUS PLASMA

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In the course of our systemic lupus erythematosus (S.L.E.) plasma transfusion experiments we have succeeded in producing the lupus erythematosus (L.E.) cell phenomenon in man and dog (Bencze, Cserháti, Kóvacs, and Tiboldi, 1958; Bencze and Ludányi, 1960). Our further experiments have confirmed the existence of two types of lupus erythematosus plasma factor, one transferable and one non-transferable (Bencze, Kóvacs, and Cserháti, 1959; Bencze, Lakatos, and Ludányi, 1960). These two types of factor produced identical results in man and dog, the S.L.E. plasma factor of transferable type proving to be transferable in every case and vice versa. These two types of factor are independent of the recipient, depend exclusively on the plasma of the donor, and the amount transfused has no bearing on their incidence.

This paper reports on our recent plasma transfusion experiments, performed on rabbits, guinea-pigs, rats, and mice, with plasma obtained from three patients with S.L.E. The plasma factor from these three patients proved to be transferable in repeated experiments, and an amount of 0·125 to 1·0 ml./kg. body weight transfused into dogs, produced the L.E.-cell phenomenon in all cases.

Acute Experiments

Blood was taken in sterile conditions (with heparin added) from the three L.E.-cell positive patients; it was centrifuged and the plasma was kept at 4° C. The plasma was incubated at 37° C. for 30 min. before use, except in one group of experimental animals in which fresh plasma was used. The rabbits received 1·0-6·0 ml., the guinea-pigs 1·0-8·0 ml., the rats 6·0-20·0 ml., and the mice 8·0-60·0 ml./kg. body weight respectively. It was administered to the guinea-pigs intracardially, and to the rabbits, rats, and mice intravenously.

L.E.-cell examinations were made by the methods of Snapper and Nathan (1955), Zimmer and Harr-graves (1952), and Zinkham and Conley (1956), on some animals in 10 to 60 minutes after the plasma injection, and in the others in 2, 4, 6, and 24 hrs respectively. The L.E.-cell examination was carried out in the guinea-pigs and rabbits by all the three methods, in rats only by that of Zimmer and Harr-graves (1952), and in mice only by that of Snapper and Nathan (1955). The animal's own leucocytes were used by Snapper and Nathan's ring method: i.e. before administering the S.L.E. plasma we took the blood from the animals for preparing the rings, and after the plasma transfusion we brought it together, always with their own leucocytes.

Plasma transfusion experiments were performed on 157 rabbits, 156 guinea-pigs, 103 rats, and 193 mice altogether. This large number of animals was necessary because we investigated males and females separately, and carried out the L.E.-cell examinations at different times and by various methods. In the 609 experimental animals, L.E. cells were observed in only one rabbit and three rats; in the other 605 animals there were no L.E.-cells; in 27 animals pseudo-L.E.-cells were found. We failed, therefore, to produce the L.E.-cell phenomenon in rabbits, guinea-pigs, rats, and mice with plasma obtained from the three S.L.E. patients even when we used much more plasma than that used for the dogs, reckoned in ml./kg. body weight (Table, opposite).

In fact we used twenty times more plasma in rabbits and guinea-pigs, forty times more in rats, and 100 times more in mice.

To decide whether this negative result was produced by the reduced phagocyte-ability of the animal leucocytes, after the S.L.E.-plasma injection, we added a quantity of normal human leucocyte-suspension to the blood obtained from the animals,
in 43 rabbits and 26 guinea-pigs.* In no case was the L.E.-cell phenomenon produced in the rabbits and guinea-pigs in this group.

**Chronic Experiments**

From the plasma† obtained from one of the three patients with S.L.E., we gave 0·5 ml. intracardially every second day for 12 days to 21 guinea-pigs. Eight control guinea-pigs received intracardially on alternate days normal plasma, and were kept under the same conditions as the experimental animals. Before and during the experiment L.E.-cell investigations were performed by Snapper and Nathan's ring method, and protein electrophoresis, thymol-turbidity test, Kürten-reaction, Sia-, cryoglobin examinations, and the paratoluene-sulphonacid flocculation test were also carried out. Nine of the 21 experimental guinea-pigs died in from 7 to 10 days after the plasma injection, and the other 12 survived, on the average, for 22 days, the longest survival period being 60 days. The liver, spleen, lungs, kidneys and heart of these animals were histologically investigated. No difference was found between the experimental and the control groups, either by histological or by laboratory investigation; the L.E.-cell examination, performed by Snapper and Nathan's ring method at different times, was negative in all cases.

**Summary**

Plasma transfusion experiments were carried out on 609 rabbits, guinea-pigs, rats, and mice, with plasma obtained from three patients with S.L.E. Serum from these patients had enabled the L.E.-cell phenomenon to be transferred to man and dog, but this transfer was not effected in the 609 animals, even with much greater amounts of transfused plasma, reckoned in ml./kg. body weight.

In chronic experiments on 21 guinea-pigs, no L.E.-cell phenomenon was produced, even after repeated transfusions of plasma, and no change characteristic of S.L.E. was found either histologically or by laboratory investigation.

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* The plasma was pipetted off with leucocytes from the animals' blood with heparin added, then the normal human leucocyte-suspension was added and the L.E.-cell investigation was performed by the method of Zinkham and Conley.

† The plasma was obtained under sterile conditions, was kept at 4° C. and −10° C. respectively, and incubated at 37° C. for one hour before use.

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### RESULTS OF ACUTE EXPERIMENTS

<table>
<thead>
<tr>
<th>S.L.E. PATIENT'S No.</th>
<th>LUPUS ERYTHEMATOSUS CELL</th>
<th>S.L.E. PLASMA QUANTITY [ml/kg.]</th>
<th>S.L.E. PLASMA TRANSFUSION TO DOGS O-125 - 10 ml/kg.</th>
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<thead>
<tr>
<th>Animal</th>
<th>L.E.-cell Negative</th>
<th>L.E.-cell Positive</th>
<th>Pseudo-L.E.-cell</th>
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<tbody>
<tr>
<td>Rabbit</td>
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<td>Guinea-pig</td>
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<td>Mouse</td>
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REFERENCES


Transfusion expérimentale de plasma atteint de lupus érythémateux disséminé aux lapins, cobayes, rats et souris

RÉSUMÉ

On procéda à des transfusions expérimentales à 609 lapins, cobayes, rats et souris de plasma prélevé à trois malades atteints de lupus érythémateux disséminé. Avec le sérum de ces malades on avait réussi à transmettre le phénomène L.E. à l’homme et au chien, mais on a échoué dans le cas des 609 animaux mentionnés, même avec des quantités beaucoup plus grandes de plasma transfusé, calculées en ml./kg. de poids corporel.

Au cours des expériences de chronicité sur 21 cobayes on ne réussit pas à reproduire le phénomène L.E., même après des transfusions répétées, et aux examens histologiques et de laboratoire on ne trouva aucun indice de lupus érythémateux disséminé.

Transfusion experimental a conejos, cobayos, ratas y ratones de plasma de enfermos con lupus eritematoso diseminado

SUMARIO

Se hicieron transfusiones experimentales a 609 conejos, cobayos, ratas y ratones de plasma obtenido de tres enfermos con lupus eritematoso diseminado. Con el suero de estos enfermos había sido posible la transmisión del fenómeno L.E. al hombre y al perro, pero tal transmisión no fue lograda en el caso de los 609 animales, a pesar de cantidades mucho mayores de plasma inyectadas, calculadas en mililitro por kilogramo de peso.

En el curso de experimentos de cronicidad sobre 21 cobayos, la transmisión del fenómeno L.E. no fue lograda, no obstante transfusiones repetidas, e investigaciones histológicas y de laboratorio no dieron indicio alguno de lupus eritematoso diseminado.
Experimental Transfusion in Rabbits, Guinea-pigs, Rats, and Mice of Systemic Lupus Erythematosus Plasma

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