

# Initial Treatment of Systemic Lupus Erythematosus with a New Artificial Reticuloendothelial System

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## ABSTRACT

Artificial reticuloendothelial system, which was made on an immobilized phenylalanine column, has been developed to remove denatured protein from serum. This system was used to treat systemic lupus erythematosus effectively. Lupus angiitis has been markedly improved with 12 treatments.

**Index Entries:** Systemic lupus erythematosus, treatment with an artificial reticuloendothelial system; lupus, treatment with an artificial reticuloendothelial system; reticuloendothelial system, treatment of SLE with an artificial; immunoadsorbent, treatment of SLE with; plasmapheresis, treatment of SLE with.

## INTRODUCTION

A new system to replace plasma exchange in order selectively to remove only pathogenic large molecular substances is eagerly awaited

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(1,2). Thus, the authors have developed a new immunoadsorbent, and clinical improvements from its use with an systemic lupus erythematosus (SLE) patient are reported herewith.

## MATERIAL

For the new immunoadsorbent, phenylalanine was immobilized on porous poly (vinyl alcohol) gel particles 74–210  $\mu\text{m}$  in diameter.

## PATIENT

A 36-yr-old female was diagnosed to have SLE at 25 yr of age. Seven years later she showed general fatigue, joint pain, alopecia, fever, and was put on a regimen of 30–45 mg/d prednisolone. However, she developed steroid-induced glaucoma, so the dosage was reduced to 20 mg/d in combination with 100–200 mg/d cyclophosphamide. Agranulocytosis and thrombocytopenia led to the decision to put her on only 20 mg/d prednisolone without cyclophosphamide for 8 months prior to the immunoadsorption treatment.

## METHODS

The patient's blood was passed through a hollow fiber plasma separator (Asahi Hi-05) at 100 mL/min, and plasma was separated at 20 mL/min. The separated plasma was passed through the immunoadsorption column and a course filter, and then returned to the venous blood circuit. Heparin was used for anticoagulation. Treatments were given for 3 h thrice weekly for 2 wk, for a total of six treatments as one series. A 2-wk rest period was used between each 2-wk series. Fifteen minutes after extracorporeal circulation was begun, plasma was sampled from the inlet of the immunoadsorption column. Before and after each treatment, a digital plethysmogram was obtained from both forefingers. Room temperature was maintained at 25°C. A Fukuda TP-300 plethysmograph was used.

## RESULTS

### *Subjective Symptoms*

The fingers became warmer after each immunoadsorption treatment. Knee joint pain was relieved by one series of treatments. Before

these treatments, the patient needed a rest halfway up the stairs, but it was possible for her to go upstairs without any rest by the end of the first series. More relief of the knee joint pain was noticed during the rest period between two treatment courses. The pre-treatment fingertip redness believed to be caused by vasculitis (from the tip to the MP joint level in all fingers) almost disappeared by the end of the first series of treatments. It completely disappeared in the little finger, and only a very slight redness was left on the tip of the other fingers. By around the end of the second course of treatment, the alopecia and photosensitivity had disappeared.

### ***Fingertip Plethysmogram***

Before the series of immunoadsorption treatments, the fingertip plethysmogram was almost flat, with no volume pulse heights. However, with each treatment, the volume pulse height increased, and the post-treatment level was significantly higher than the pre-treatment level (right forefinger:  $p < 0.05$ , left forefinger:  $p < 0.1$ ). Moreover, a gradual improvement of the pre-treatment level was noted with each successive treatment.

### ***Laboratory Data***

Pre-treatment levels of RAHA, RA factor, antinuclear antibody, and immune complex continued to show improvement with each successive treatment (Fig. 1). The anti-DNA antibody level was within the normal range (i.e., 5 U/mL) before the series of treatments was begun, but it fell further, and was less than 1 U/mL after the seventh treatment. No fixed trend was noted in the plasma IgG or IgA levels, but the IgM showed a slightly downward trend. The fibrinogen also showed a slightly downward trend. The ENA antibody levels showed no change whatsoever. The total protein, albumin,  $\alpha_2$ -macroglobulin, AT-III, C<sub>3</sub>, C<sub>4</sub>, and CH<sub>50</sub> levels displayed no uniform trend.

## **DISCUSSION**

When the immunoadsorption treatment was initiated with no alteration of the prednisolone dosage, serum rheumatoid factor, antinuclear antibody, anti-DNA antibody, immune complex, and IgM levels decreased, and there was marked recovery from symptoms such as vasculitis, joint pain, photosensitivity and alopecia. These findings suggested that the new immunoadsorption column was highly effective for the SLE treatment.

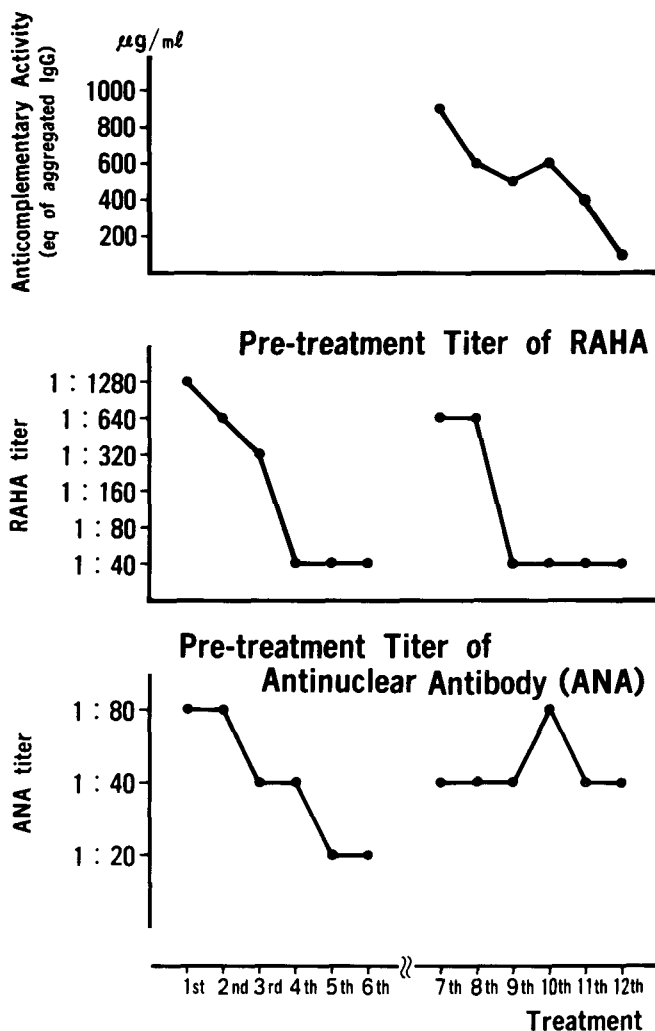


Fig. 1. Pre-treatment levels of anticomplementary activity (immune complex), RAHA, and antinuclear antibody gradually decreased following treatment.

## REFERENCES

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