
Experience with Administration of Modified Arabinoxylan from Rice Bran (BioBran/MGN-3) in Patients with Rheumatoid Arthritis

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Abstract

The functional food, rice bran arabinoxylan derivative (BioBran/MGN-3), was administered over a long period to patients with rheumatoid arthritis given mainly symptomatic treatment with steroids, to evaluate its supplementary effect with representative treatments for rheumatism, such as steroids, analgesics, and thermotherapy. Steroids are essential for treatment of rheumatism, but it is desirable to minimize the dose, to avoid adverse reactions. In recent years, there have been many reports on the functions of food ingredients, including superoxide scavenging and biophylaxis improving actions. This study evaluated the efficacy of BioBran/MGN-3, a functional food material. BioBran/MGN-3 has been reported to have the effects of activating natural killer cells (NK cells) and inhibiting inflammation. The author confirmed and reported that it relieved cold symptoms in the elderly. The present study, where 8 patients with chronic rheuma-

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tism were given BioBran/MGN-3 for 6 to 12 months, demonstrated the improvement in symptoms and QOL, suggesting its effectiveness.

Introduction

Rheumatoid arthritis is an autoimmune disease, where the IgG and IgM autoantibodies, rheumatoid factors, are produced in synovial fluid in response to IgG and recognize each other to form IgM-IgG complexes, which induce inflammatory reactions. The immune complexes activate complement, which promotes tissue destruction by attracting polymorphonuclear leukocytes and simultaneously activates basophils and platelets, stimulates release of histamine and serotonin, and increases vascular permeability, leading to further increase in immune complex deposition. Corticosteroids and nonsteroidal anti-inflammatory drugs are generally used in treatment of rheumatism. Immunosuppressants are also sometimes combined to inhibit the production of autoantibodies. Thus, patients are likely to experience adverse reactions. In this study, the rice bran arabinoxylan derivative (BioBran/MGN-3), a functional food with immunomodulatory and anti-inflammatory effects, was administered to evaluate its supplementary effect during treatment with steroids and analgesics.

Study Method and Clinical Courses

BioBran/MGN-3, a derivative of hemicellulose contained in the rice coat, is a biological response modifier (BRM) that mainly consists of polysaccharide composed of arabinose and xylose¹⁾. Eight patients with chronic rheumatism were administered BioBran/MGN-3 for 6-12 months to observe changes in their subjective symptoms and CRP and improvement in QOL. Five of 8 patients were on steroids and analgesics and the others on analgesics, chinese medicines, and thermotherapy.

The clinical courses of 3 patients who responded well to BioBran/MGN-3 will be reported below.

Case 1

1. Symptoms and treatments

A 78-year-old woman received regular treatment for osteolytic rheumatism from March 1998. The disease was classified as Stage IV in Class III by the Stein-Blocker classification.

The patient was orally given Predonine at 10 mg and Bucillamine at 200 mg/day as a symptomatic therapy. She had severe pain and walking difficulty, and bone destruction was progressive. Artificial joint replacement was recommended, but postponed on her wishes. After obtaining her consent, BioBran/MGN-3 was administered from April 17. She had severe pain in both hands and knees and the joints, slept poorly, and was almost bedridden. Serological test results were ++ for RA test, 65 IU/ml for RF, and 2.0 mg/dl for CRP. The dose of BioBran/MGN-3 was 1 g/day during the 1st week, 2 g/day for next 3 weeks, and 3 g/day after that.

2. Clinical course

Pain in the hands and feet were relieved at 1 week of BioBran/MGN-3 intake, and she was able to sleep well and walk using a walker. She had reduced pain in the knee and foot joints at 2 weeks and could walk with a cane at 1 month. In the serological test on October 5, the RA test result was +, RF 34 IU/ml, and

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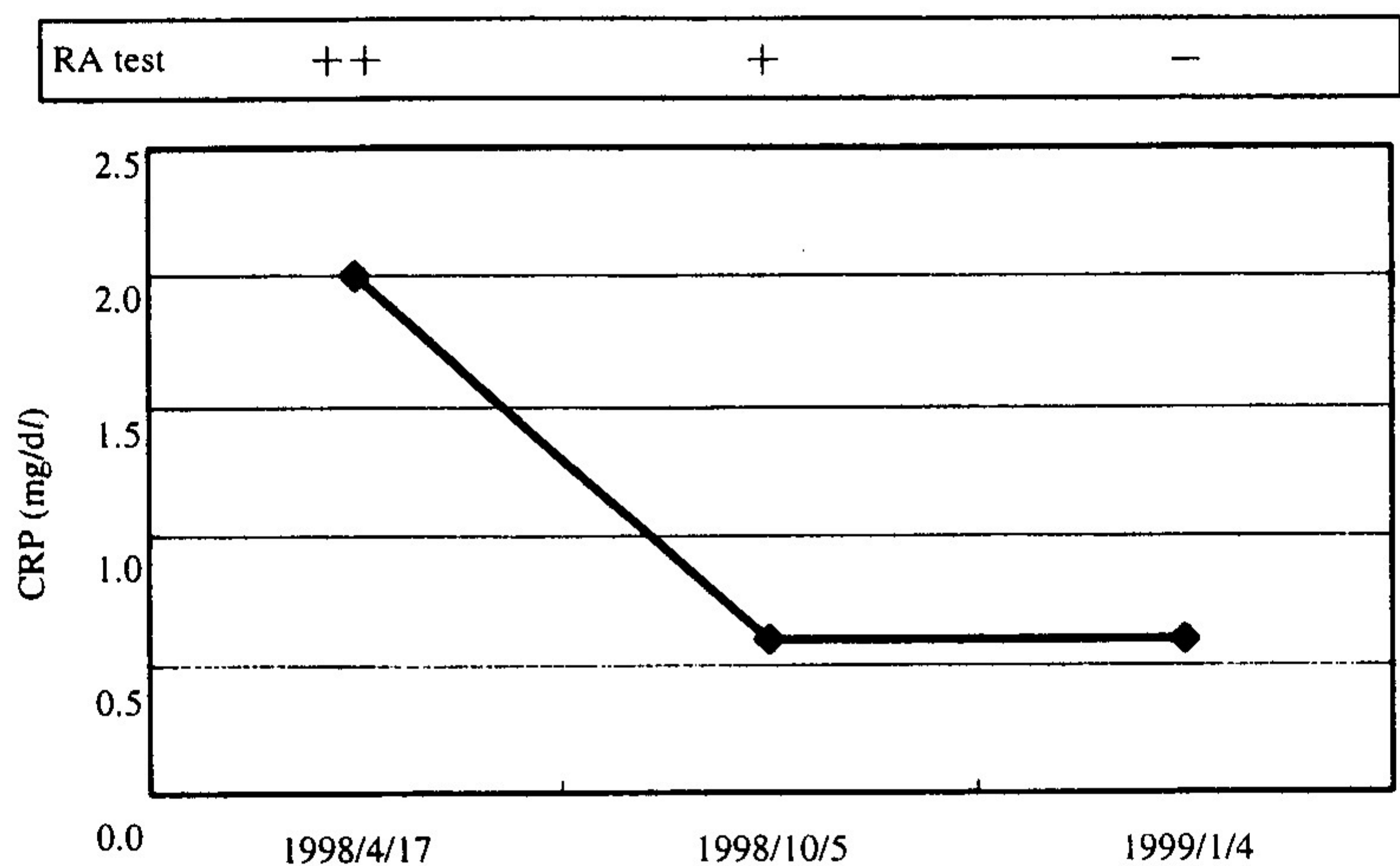


Fig. 1 Changes in CRP and RA test

CRP 0.6 mg/dl, and the steroid and DMARD were withdrawn. On January 4, 1999, the RA test was -, RF 14 IU/ml, and CRP 0.6mg/dl, and the disease followed a good course (the normal range for RF was ≤ 20 IU/ml) (Fig. 1).

Case 2

1. Symptoms and treatment

A 77-year-old woman visited our clinic in March 2003. She had severe pains in the hand and foot joints, sleeplessness, and markedly reduced physical strength through decreased appetite. The disease was classified as Stage IV in Class III. The RA test result was +++, RF 500 IU/ml, and CRP 1.8 mg/dl. She was diagnosed as having typical rheumatism. The steroid Predonine at 10 mg and a DMARD were given combined with thermotherapy, but pain persisted without any benefit. Administration of BioBran/MGN-3 at 3 g/day was started on June 20, 2000, and continued for 1 year, after which the dose was decreased to 2 g/day. She receives the therapy until now.

2. Clinical course

Pain in the hands and feet was reduced after 3 days of administration of BioBran/MGN-3, and the patient was able to sleep and had increased appetite. At 3 months, pain in the hand and foot joints were further reduced, and she gained 2 kg. In late December at 6 months, the pain became endurable and test values improved: the RA test was ++, RF 62 IU/ml, and CRP 1.0 mg/dl. The steroid was withdrawn and only the DMARD was given. In June 2001, she still took BioBran/MGN-3 at 2 g/day and symptoms were stable.

Case 3

1. Symptoms and treatment

A 39-year-old woman visited our clinic on June 10, 2000. A diagnosis of rheumatism was made and she was given steroid Predonine at 15 mg, an analgesic, Chinese medicine, and thermotherapy. BioBran/MGN-3 was administered from October 5. The dose was 1 g/day during the 1st week, 2 g/day for the next 1

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month, and 3 g/day after that. The RA test result was ++, RF 320 IU/ml, and CRP 1.6 mg/dl.

2. Clinical course

Coldness in her hands and feet was reduced after 3 days of administration of BioBran/MGN-3, and the frequency of pain decreased. The pain was further reduced at 1 week, and the analgesic was withdrawn. Facial and hand swelling were reduced in early November at 1 month. At 3 months, she had almost no pain and could sleep well. The RA test result was +, RF 92 IU/ml, and CRP 1.0 mg/dl. The dose of the steroid was decreased to half the previous level. She had no pain and could bend both middle fingers freely in April 2001 at 6 months.

Results and Discussion

BioBran/MGN-3 had a very good effect on 3 of the 8 patients. Subjective symptoms, especially pain, improved, and the RA index and CRP level decreased. The steroid was completely withdrawn in 2 patients, and the dose was decreased in the remaining one. Two other patients, in whom no very good effect was observed, had improved subjective symptoms. As a result, their QOL improved. The 3 remaining patients had neither improvement nor exacerbation in the 6-month administration period. Although symptoms were expected to worsen temporarily because of the immune-enhancing effect of BioBran/MGN-3, gradual increase of the dose caused no adverse reactions in any patient.

There are many reports of actions of BioBran/MGN-3. NK-cell activation (Ghoneum et al.)²⁾, anti-inflammatory effect on a rat asthma model (Endo et al.)³⁾, survival improvement in an LPS-induced sepsis model (Kubo et al.)⁴⁾, intestinal-membrane protection against anticancer drugs in mice (Jacoby et al.)⁵⁾, protection against anticancer drugs in mice (Endo et al.)⁶⁾ and resistance to drug-related hepatic impairment (Sanada et al.)⁷⁾. From these, BioBran/MGN-3 could be suggested to be a functional food that enhances immunity and exerts a prophylactic effect based on the anti-inflammatory action. The authors conducted a double blind clinical study to evaluate the preventative effect of BioBran/MGN-3 on the common cold syndrome in elderly people who stayed in the author-managed care institution and confirmed the effect of symptomatic relief⁸⁾. BioBran/MGN-3 showed the effect in a relatively short time in the patients in this study. These good results may have been because it exerted an anti-inflammatory effect on rheumatism and at the same time, enhanced immunity: it was reported that patients with rheumatism are generally immunocompromised because of decreased lymphocyte counts⁹⁾.

Conclusion

These results suggested the efficacy of BioBran/MGN-3 as a supplement therapy. The main mechanism of the action is considered relief of immunological inflammation. We propose to try this therapy further, because it caused no adverse reactions.

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