

# The Effectiveness of *Coriolus versicolor* Supplementation in the Treatment of Kaposi's Sarcoma in HIV<sup>+</sup> Patients.

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**Background:** Immune enhancement properties of select plants and mushrooms have been studied by Japanese researchers in the 1960's, with the majority of mycological research focused on extracts derived from both *Ganoderma lucidum* (reishi) and *Lentinula edodes* (shiitake).

In the late 1960's, a hot water extract of *Lentinula edodes* (Berk)Sing. edible mushroom, completely inhibited the growth of sarcoma 180 implanted subcutaneously in ICR mice.

From the extract, Professor Goro Chihara isolated and purified a polysaccharide, which showed marked antitumour activity, and named the polysaccharide Lentinan (1). However, Lentinan was proven to be too toxic for long term clinical use (2).

It was the search for a mycological extract that had less toxicity and fewer side effects than Lentinan that led researchers at Kureha Chemical Industry Company to focus on the effectiveness of the oral administration of Polyporaceae (one of the Basidiomycetes) on stomach cancer patients.

Kureha screened over 200 species of the fruit bodies of the Basidiomycetes for their antitumor activity against various tumour cells, including sarcoma 180 and found several promising Polyporaceae strains (3). Among these strains *Coriolus versicolor* (Fr.) Quel (kawaratake), was considered to be the most suitable for further fractionation due to its high antitumour activity and stability during serial cultivation (4)

Extracts of cultured mycelia of *Coriolus versicolor* demonstrated antitumour activity comparable to that of the fruitbody. In 1971, the active principle was precipitated from extracts of cultured hyphae of *Coriolus versicolor* (Fr.) Quel (CM-101 strain) with saturated ammonium sulfate, desalted and named PSK or Krestin (5). PSK has been reported to induce host-mediated antitumor activity (6).

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- (1) "Medical Aspects of Lentinan Isolated From *Lentinus Edodes* (Berk) Sing"-Goro Chihara, Biotechnology Research Centre, Teikyo University, Nogawa 907, Miyamae-ku, Kawasaki 213, Japan. Chapter 27-Mushroom Biology and Mushroom Products-Preceedings of the Second International Conference-University Park, Pennsylvania June 9-12, 1996. Edited by D.J. Royce.
- (2) Translation of "Cancer Immunotherapy 1977"-Takeo Mori, Tadaaki Sakai, Ichiji Itoh, Tokyo Metropolitan Komagome Hospital, Published by Life Science August 5th, 1977.

- (3) "Diverse Biological Activity of PSK (Krestin), A Protein-Bound Polysaccharide from *Coriolus versicolor* (Fr.) Quel-Hiroshi Sakagami and Minoru Takeda-First Department of Biochemistry, School of Medicine, Showa University, 1-5-8 Hatanodai, Shinagawa-ku, Tokyo 142 Japan, Page 237 Chapter 25-Mushroom Biology and Mushroom Products-Proceedings of the Second International Conference-University Park, Pennsylvania June 9-12, 1996, Edited by D.J. Royce.
- (4) Ibid Page 237
- (5) Ibid Page 237
- (6) Ibid Page 237

## **Aim of Study**

To assess the efficacy of non-fractionalized *Coriolus versicolor* supplementation in HIV<sup>+</sup> patients with Kaposi's Sarcoma. The principal parameters being CD4 count, quality of life assessment as well as visual observation of the Kaposi's Sarcoma.

## **Study Design**

**-Open label study in three (3) patients.**

### **-Inclusion Criteria**

- Male patients over 35 years
- HIV<sup>+</sup> and suffering from Kaposi's Sarcoma
- CD4 count less than 250

### **-Exclusion Criteria**

None

### **-Outcome Measures**

CD4 counts were taken prior to *Coriolus* supplementation and after the supplementation period. The supplementation period averaged five and one-half (5 1/2) months.

Patients were interviewed both prior to, during and after *Coriolus* supplementation period to assess changes in quality of life.

Visual observations of Kaposi's Sarcoma were noted during *Coriolus* supplementation and after the supplementation periods. Patients also provided their assessment of changes in their Kaposi's Sarcoma status during supplementation period.

### **-Supplementation Scheduling**

Daily supplementation commenced at 3.0 grams (6 tablets x 500 mg) and was gradually increased to either 6.0 grams and/ or 9.0 grams over three (3) months after initial *Coriolus* supplementation.

In Patient B, after three (3) months supplementation of 3.0 grams, supplementation was increased to 9.0 grams. After reaching 9.0 grams, Patient B remained at this supplementation level for four (4) months. (Supplementation period 7 months.)

In Patient C, after 14 days, supplementation of 3.0 grams was increased to 6.0 grams and after another 30 days, supplementation was increased to 9.0 grams. After reaching 9.0 grams, Patient C remained at this supplementation for two months. (Supplementation period 3 ½ months.)

In Patient D, after two (2) months, supplementation of 3.0 grams was increased to 6.0 grams. After reaching supplementation of 6.0 grams, Patient D remained at this supplementation level for six months. (Supplementation period 8 months.)

At the end of the supplementation period (which averaged over five (5) months), CD4 counts were measured within 120 days of cessation of supplementation.

## RESULTS

Patient B	23-04-1998	28-05-1998	17-07-1998	10-09-1998	30-11-1998	31-01-1999
CD4	240		420	680		630
PCR	200.000			0		250
Kaposi's Sarcoma	Spreading	Stable	Fading	Remission		Returns
Triple Therapy	Yes	Ceases	None	None		Commencing
Daily Dosage	3.0 g	3.0 g	9.0 g	9.0 g	Stops	Stops

Patient C	14-08-1998	26-08-1998	15-09-1998		31-11-1998	31-02-1999
CD4	220					100
PCR	100.000					300.000
Kaposi's Sarcoma	Arms, legs eyes	Stable	Decrease			Spreading
Triple Therapy	None	None	None			Commencing
Daily Dosage	3.0 g	6.0 g	9.0 g		Stops	Stops

Patient D	29-05-1998	20-07-1998	10-09-1998		31-11-1998	30-01-1999
CD4	240					190
PCR	26.000					19.800
Kaposi's Sarcoma	Legs, feet	Fading	Fading			Increasing
Triple Therapy	None	None	None			None
Daily Dosage	3.0 g	6.0 g	6.0g		Stops	Stops

During supplementation period all three patients experienced either remission, decrease or fading in Kaposi's Sarcoma. All three patients commented on increased feeling of energy.

One patient (Patient B) experienced significant increases in CD4 during *Coriolus* supplementation and a slight decrease within 120 days after cessation of *Coriolus* supplementation.

Within 120 days of cessation of *Coriolus* supplementation, CD4 counts decreased in all patients (from the prior recording of CD4) and Kaposi's Sarcoma returned in all three (3) patients.

## **DISCUSSION**

There were positive signs in the study, with the partial remission in Kaposi's Sarcoma for all three (3) patients, at *Coriolus* supplementation levels equal to or greater than 6 grams per day.

In addition, all patients noted increased energy while taking supplementation as compared to not taking *Coriolus* supplementation.

With the cessation of *Coriolus* supplementation, the relapse in Kaposi's Sarcoma symptoms in three patients may indicate that supplementation nutrition may play a role in host mediated immune response.

Taking into account the limitations of such a small sample size, we have a curiosity. Further research is required to confirm that *Coriolus versicolor* supplementation at 6.0 grams or higher is an effective adjuvant nutrition therapy for HIV<sup>+</sup> patients with Kaposi's Sarcoma.

Future studies should consider incorporating a gradual increase in monthly *Coriolus* supplementation, from 3.0 grams, to 6.0 grams to 9.0 grams. With 9.0 gram/day supplementation level reached in the third month of supplementation period.

At the end of each month biometric measurements such as CD4, CD8 and CD19 should be taken, along with observations of Kaposi's Sarcoma. A supplementation reduction to 6.0 grams per day should be considered to test if host-mediated response could be sustained with lower supplementation levels.

We invite other researchers to explore the hypothesis that *Coriolus versicolor* plays a role in initiating host-mediated response.

## **CONCLUSION**

The results of this open label study indicate that non-fractionalized *Coriolus versicolor* supplementation could be an effective nutrition adjuvant for HIV<sup>+</sup> patients with Kaposi's Sarcoma. Further research is required to explore this curiosity in greater detail.