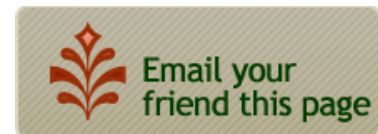


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TOP



PSP has been shown to manifest immunomodulatory and anticancer properties in both pre-clinical experiments and clinical trials. It has been shown to reduce the side effects of radiotherapy and chemotherapy and has been used as an adjunct medical modality to conventional cancer treatment. Experiments suggest that PSP can boost the immune system and alleviate the symptoms of chemotherapy.<sup>11</sup>

Pre-clinical Mechanistic Studies :

In vitro , PSP is effective for activating T lymphocytes, B lymphocytes, monocytes, as well as promoting the proliferation and production of antibodies and various cytokines such as interleukin-2 and interleukin-6. <sup>4</sup> Numerous in vivo studies have also revealed that PSP is capable of restoring certain depressed immunological responsiveness caused by tumor progression, chemotherapy and radiation therapy.<sup>5, 6</sup>

Several studies reported that PSP possesses selective anti-cancer activity against certain cancer cells. PSP dose-dependently and time-dependently suppresses proliferation of human cancer cell lines. Xu showed that PSP markedly inhibited the growth of several human cancer cell lines including lung (SPC) cancer cell lines. <sup>7</sup> Similar findings also indicate that PSP can act selectively in HL-60 leukemic cells by arresting the cell in the G-phase of the cell cycle and including apoptosis but not affecting normal lymphocytes . <sup>8</sup> In vivo anti-tumor activity of PSP has also been extensively studied. Significant tumor size reduction was shown after prolonged administration of PSP in mice inoculated with lung adenocarcinoma (Lewis lung cancer). <sup>9</sup>

Clinical Efficacy Studies:

Since there is lack of clinical trials on the efficacy of PSP in adjunctive lung cancer treatment, a clinical study was conducted by Dr. Kenneth Tsang at the University of Hong Kong's School of Medicine in 1999, on the PSP treatment of patients with advanced non-small cell lung cancer.<sup>10</sup> This study was a phase II double-blind placebo - controlled randomized clinical trial in 68 patients with advanced NSCLC who were equally recruited into PSP treatment and placebo group respectively. Patient enrollment commenced from 1999 to 2001 with the inclusion criteria of having a Karnofsky performance scale bigger than 60, life expectancy longer than 12 weeks and TNM stage III or IV ( II ). Patients who had radiotherapy or chemotherapy were also permitted to take part if they completed treatment at least four weeks prior to study.

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Eligible patients were randomized by taking either three capsules of PSP (340mg each) or an identical placebo (350mg crystallized sucrose each) three times a day for four weeks. Clinical and laboratory evaluation of patients was performed at the beginning and after the four-week treatment.

After the four-week treatment, there was a significant increase in blood leucocyte and neutrophil levels and body fat compared with pre and post treatment of PSP. Serum IgG and IgM were significantly improved in the PSP treated group compared to the placebo group after four weeks. In addition, there were less PSP treated patients who withdrew from the study due to disease progression. Therefore, this study suggests that PSP treatment may be of some benefit in patients with NSCLC. (See table 1)

	PSP		Placebo		+P
	Pre-Rx Mean (sd)	Post-Rx Mean (sd)	Pre-Rx Mean (sd)	Post-Rx Mean (sd)	
Hemoglobin (g/dl)	12.1 (1.40)	12.3 (1.23)	12.6 (1.59)	13.0 (1.45)	0.76
WBC (10 <sup>9</sup> /l)	6.4 (1.76)	7.3 (2.39)*	6.9 (5.22)	6.8 (3.06)	0.73
Neutrophils (10 <sup>9</sup> /l)	4.4 (1.47)	5.2 (2.21)*	5.1 (5.34)	4.8 (2.85)	0.77
Platelet (10 <sup>9</sup> /l)	264.7 (81.68)	267.8 (98.46)	245.0 (103.64)	243.8 (80.15)	0.97
Creatinine (μmol/l)	91.2 (13.15)	92.0 (13.28)	84.7 (13.74)	90.4 (17.95)	0.21
IgA (mg/dl)	268.3 (96.90)	280.6 (108.45)	305.2 (114.30)	292.4 (108.95)	0.85
IgG (mg/dl)	1468.8 (447.89)	1590.4 (504.89)*	1574.1 (741.27)	1532.8 (712.01)	<b>0.02</b>
IgM (mg/dl)	1311 (63.15)	1393 (64.32)*	142.7 (81.91)	126.9 (59.29)	<b>0.04</b>
Albumin (g/l)	40.6 (4.28)	40.5 (3.30)	40.6 (5.29)	41.2 (4.47)	0.91
Globulin (g/l)	37.4 (5.94)	38.3 (6.44)	37.8 (8.78)	36.8 (8.41)	0.20
Aspartate transaminase (U/l)	21.8 (8.48)	21.8 (6.28)	30.5 (28.94)	23.4 (6.10)	0.17
Alanine transaminase (U/l)	16.8 (9.69)	16.6 (8.28)	37.7 (61.87)	21.3 (9.60)	0.20
Body mass index	21.8 (3.52)	21.8 (3.42)	24.0 (3.61)	24.1 (3.72)	0.65
Body fat contents (%)	22.5 (9.04)	23.3 (8.97)*	24.6 (7.85)	24.5 (8.20)	0.08

\*P < 0.05 when compared with baseline data from within-group comparison. +P values obtained on between group comparisons on post-treatment data.  
 PSP = Yun-zhi polysaccharide peptide.

Table 1: Results of blood test and other investigation on patients with non-small cell lung cancer

Conclusion :

A substantial number of preclinical and clinical studies continue to suggest PSP administration may be a useful adjunct to conventional cancer therapy. While PSP is commonly used by patients who access conventional cancer care, further preclinical studies are necessary to establish its mechanisms of

anti-cancer and immunomodulatory action and clinical trials are needed to prove the mechanistic effects that have been observed in vitro and in animal studies. For cancer patients who view conventional medicine with ambivalence, practitioners can foster a more open and communicative relationship by demonstrating an objective understanding of both alternative and conventional approaches. Using alternative and complementary medicine treatments may be able to improve the quality of life for those suffering from terminal diseases such as lung cancer.

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