

Research on Bio-Strath®

Preparations



for professional use

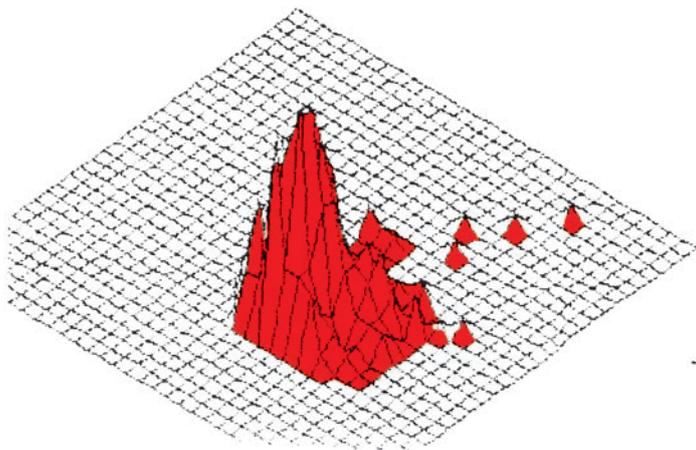


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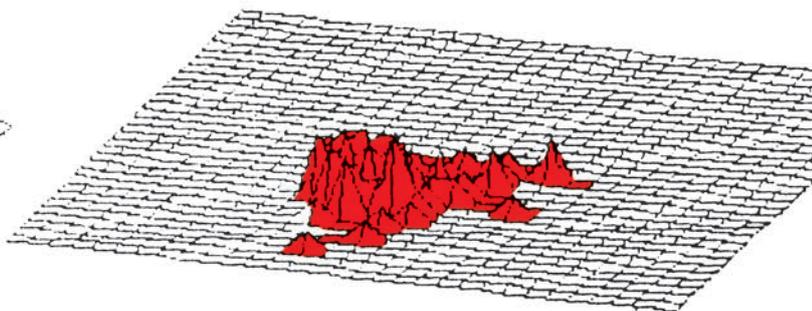
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Reinforcing immune defence with Bio-Strath® by increasing the quantity of Helper/Inducer-T-lymphocytes

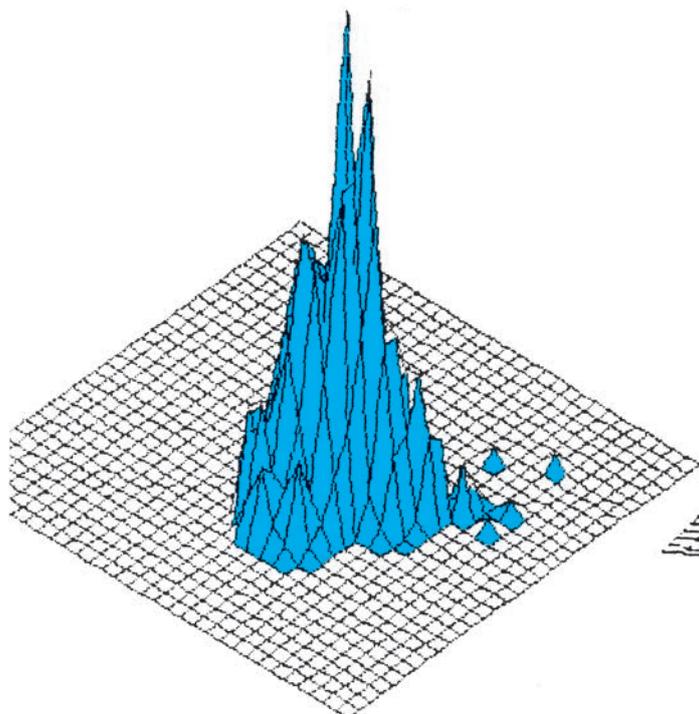
Total of immunocytes in three-dimensional representation of the FACS computer analysis



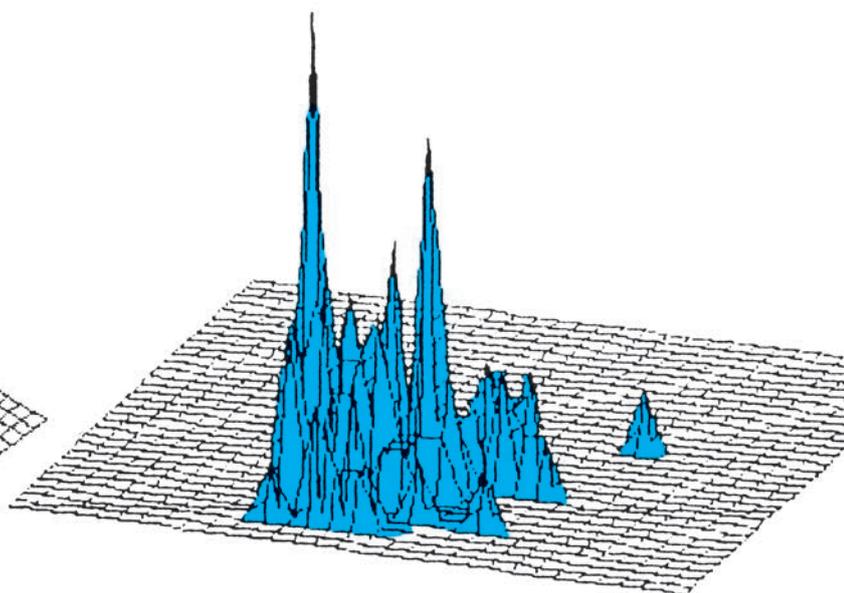
Total of immunocytes
without Bio-Strath®,
without bacterial infection



Total of immunocytes
without Bio-Strath®,
after bacterial infection
by Staph. aureus



Total of immunocytes
with Bio-Strath®,
without bacterial infection



Total of immunocytes
with Bio-Strath®,
after bacterial infection
by Staph. aureus

Influenza and colds in winter: Prophylaxis with a herbal yeast preparation in comparison with influenza vaccination

Studies on the therapeutic efficacy of a herbal yeast preparation (Bio-Strath®)

In a prospective field study involving a total of 232 participants and 22,600 working days, the effects of various prophylactic measures on influenza/common cold were investigated with the aid of questionnaires. The study was carried out in the winter of 1994/95 within the framework of a preventive health care program initiated by a multinational company located in the Zurich area. An analysis of their quality of life as self-assessed by the participants revealed that, in comparison with a control group and an influenza vaccination group, the groups receiving «Bio-Strath liquid herbal yeast preparation» or «Bio-Strath tablet herbal yeast preparation» showed appreciably more positive results. In the case of the objective questions referring to illnesses, the ranking based on the calculated trend curves also showed advantages for these two groups. Overall, it was found that, on the basis of the parameters investigated, the participants were, on average, healthier than the general population during the study period, and were also healthier than the participants in an American study performed during the same period.

During the winter season such classical diseases as influenza, the common cold and similar viral diseases are burdensome for the victim and are also associated with considerable costs – both direct illness-generated costs and indirect costs in the form of lost working time.

The Swiss Federal Office for Industry, Trade and Labour (BIGA) has calculated that, in Switzerland, an employee is absent from work because of influenza/colds, etc. for an average of 6 days, and works at less than full capacity for a further 26 days every winter. This makes it clear why preventive health care measures aimed at strengthening the body's own defence system are so important. Such measures may take the form of a healthy diet in combination with the use of food or herbal supplements. Among the Swiss population, about half a million people have themselves vaccinated prophylactically against influenza.

A multinational firm with approximately 600 people on its payroll operating in the Zurich area, decided to investigate the value of various

measures aimed at maintaining the health of its employees in a controlled open study involving the use of questionnaires carried out in the winter of 1994/1995. Each questionnaire covered a period of 14 days. In the final evaluation, ten questionnaires per participant were analysed. For the overall study, the results obtained from 2,256 questionnaires were available. The study included 232 employees and covered a total of 22,600 working days.

Subjects and Methods

The test subjects – who were all volunteers – were healthy male and female employees aged between 22 and 58 years (**Table 1**). The participants were divided up into 4 groups:

- Group 1: Controls not receiving a placebo;
- Group 2: Influenza vaccination; vaccine: Inflexal BERNA, single injected dose of 0.5 ml;
- Group 3: Bio-Strath liquid herbal yeast preparation, daily dose: 2x1 teaspoonful;
- Group 4: Bio-Strath tablet herbal

yeast preparation, daily dose: 2x2 tablets.

Patient compliance (regular use of the respective preparation) was checked on the basis of the patient's own declaration. The influenza vaccination or the first use of the food supplements took place between the 20th and the 30th of August, 1994. The questionnaires were completed by the participants at the start of the study, and then every 14 days from 20 October, 1994 to 17 March, 1995. The 22 items (questions) contained in the questionnaire dealt with specific aspects of the subject's general state of health and the establishment of illness-related absence from work.

The analysis of the questionnaires was carried out by the INTERDATA Forschungsinstitut (research institute), CH-6006 Lucerne. Subsequently, the data were subjected to a trend analysis by the firm ANAWA AG, CH-8602 Wangen, using the computer software programs Table-Curve from Jandel Scientific and Excel from Microsoft.

	Total	Male	Female	Questionnaires
Control group	55	32	23	541
Influenza vaccination	56	38	18	528
Bio-Strath® liquid	61	19	42	611
Bio-Strath® tablets	60	31	29	576
Total	232	120	112	2256

Table 1: Participants in the study

Results

For the sake of simplicity and clarity, only those answers that were of relevance to the specific aims of the present study were analysed. The results of the subjective self-assessment by the participants can be seen in **Table 2** and **Figure 1**.

Question 1: The current subjective state of health of the participant (Figure 1A)

Since an improvement in the self-assessed quality of life is of particular advantage, the assessment «very good» was analysed in greater detail.

The linear regression curve for the individual percentages revealed improvements for the groups «Bio-Strath liquid» (+0.22) and «Bio-Strath tablets» (+1.04), and deterioration for both the control group (-0.24) and the «influenza vaccination» group (-0.68).

Question 2: How do you feel now as compared with one month earlier (Figure 1B) in terms of:

2.1 Concentration

An analysis of the responses «better» and «much better» revealed improvements for the groups «Bio-Strath liquid» (+0.62), «influenza vaccination» (+1.70), and «Bio-Strath tablets» (+1.95), while the control group revealed deterioration (-0.22).

2.2 Fatigue

Here, too, an improvement was found in the responses for the groups «influenza vaccination» (+0.62),

«Bio-Strath liquid» (+0.64) and «Bio-Strath tablets» (+0.88), and a deterioration for the control group (-1.08).

2.3 Vitality

The improvements indicated were +0.42 for the «influenza vaccination» group, +0.66 for the «Bio-Strath liquid» group, and +1.26 for the «Bio-Strath tablets» group, while the control group revealed a deterioration (-0.16).

Question 3: Stress (Figure 1C)

The most positive result recorded here was that reported by the «Bio-Strath liquid» group (+0.60); the «influenza vaccination» group attained +0.38, and the «Bio-Strath tablets» group +0.25. In contrast, the control group subjects considered their stress situation to have become worse (-1.08).

Question 4: This complex of questions dealt directly with the infection.

4.1 Have you had fever or an increase in temperature?

The largest decrease in feverish illnesses over the duration of the study was shown by the «Bio-Strath liquid» group (-0.87), followed by the «Bio-Strath tablets» group (-0.25) and the «influenza vaccination» group (-0.18), with the control group bringing up the rear (-0.07). A further breakdown of the question in terms of the severity of the fever showed that in the control group 92% of those who went down with influenza or a cold had a temperature of at least 38°C, while in the «Bio-Strath liquid» group the corresponding percentage was 75%,

in the «Bio-Strath tablets» group 65%, and in the «influenza vaccination» group 62%.

4.2 How many days did the fever last?

As was to be expected, the curves showed a qualitatively very similar pattern, and the computed trends also revealed the same ranking as did the previous question (presence of fever, yes or no), namely -1.32 for «Bio-Strath liquid», -0.88 for the «Bio-Strath tablets» group, -0.72 for the «influenza vaccination» group, and -0.43 for the control group.

Question 5: How many days were you off work last month?

For the analysis of this item, the situation during the month prior to the start of the period of prophylactic treatment was compared with the average monthly time off work during the period of the study. After the start of the study, the percentage of those individuals who never had to take time off work increased most markedly in the «Bio-Strath liquid» group, namely more than 10%.

An evaluation of the loss of work through illness in the individual groups revealed that a few individuals with an illness of very long duration, falsified the data. Under the assumption that an attack of influenza does not last longer than 2 weeks, for the evaluation of this criterion we took account only of absences from the workplace of up to 14 days within any given month.

The reduction in work lost expressed as a percentage was most marked in the «Bio-Strath liquid» and «Bio-Strath tablets» groups (**Table 3**).

Questions on well-being Self-assessment	Control	Influenza vaccination	Bio-Strath® liquid	Bio-Strath® tablets
1.0 General well-being	- 0.24	0.68	+ 0.22	+ 1.04
2.1 Concentration	- 0.22	+ 1.70	+ 0.62	+1.95
2.2 Fatigue	- 1.08	+ 0.62	+ 0.64	+ 0.88
2.3 Vitality	- 0.16	+ 0.42	+ 0.66	+ 1.26
3.0 Stress	- 1.08	+ 0.38	+ 0.60	+ 0.25
Average	- 0.56	+ 0.49	+ 0.55	+ 1.08

Table 2: The trends shown by the answers in the individual groups during the course of the study. The higher the relative figure, the more positive the assessment. Negative figures mean a deterioration.

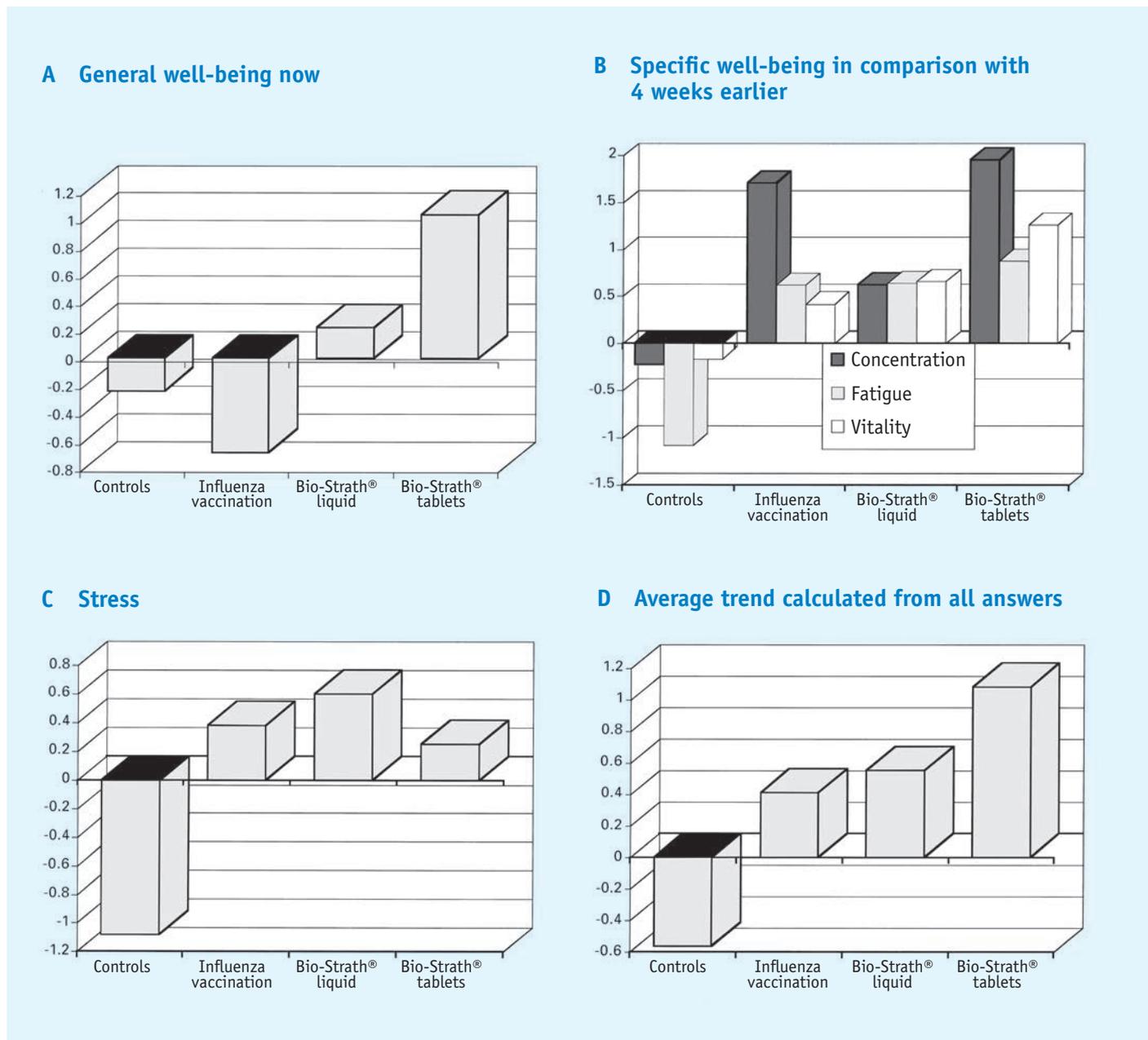


Figure 1: The trends shown by the answers in the individual groups during the course of the study. The higher the relative figure, the more positive the assessment. Negative figures mean a deterioration. **A:** General well-being now, **B:** Specific well-being in comparison with 4 weeks earlier; **C:** Stress; **D:** Average trend calculated from all answers.

	Loss of work in days (up to 14 days per person and month)		
	1 month before start of study	Monthly average during study	Reduction in work lost in %
Controls	34	10.3	70
Influenza vaccination	20	7.6	62
Bio-Strath® liquid	23	6.3	73
Bio-Strath® tablets	40	10.0	75

Table 3: Comparison of absence from work within the respective groups, 1 month prior to and during the study

Question 6: Have you taken any additional tonics or other medication?

It was found that vitamins, natural remedies and medications to treat pain/fever had been taken, and that their use was evenly distributed among all the groups.

Question 7: If you belonged to the group «Bio-Strath liquid» or «Bio-Strath tablets», did you take the product regularly (compliance)?

Only when the substance is employed regularly throughout the period under study, can a statement be made as to its effect. On the basis of the declarations by the two groups «Bio-Strath liquid» and «Bio-Strath tablets» it can be assumed that both preparations were used regularly.

Discussion

In a prospective field study supported by meticulous statistical methodology, the influence of a herbal yeast preparation (intended to strengthen the body's general immune defences) in either liquid or tablet form, and of anti-influenza vaccination was compared with a control group. The investigation lasted from October 1994 to March 1995. The data provided by the questionnaires, of which each participant completed 10, were fed into a mainframe computer and evaluated in accordance with the criteria usually used in opinion polls. In addition, the numerical material was processed using trend analysis me-

thods, with the aim of quantitatively determining more subtle differences.

The preconditions for the implementation of the study required that the participants should volunteer for inclusion in each of the individual treatment groups. This can, of course, lead to a certain bias, which could have been avoided only by randomization of the participants to the various groups. It may therefore be noted that more than twice as many women than men volunteered for inclusion in the «Bio-Strath liquid» group, while in the case of the «influenza vaccination» group this relationship was reversed.

Despite a questionnaire «cycle» of only 14 days, the discipline exercised by the participants was very good, and the majority meticulously answered all the questions throughout the duration of the study.

The results obtained from the study provide important information about the «course» of the influenza season, as well as additional information about various forms of influenza prevention in a multinational company. Thus, the investigation clearly revealed that in the case of the questions requiring a subjective assessment of quality of life, the ranking of the prophylactic substances unequivocally favoured the «Bio-Strath tablets» group, followed by the «Bio-Strath liquid» group (**Table 2**).

The editing of the questionnaires was carried out with the aim not only of obtaining quantitative data relating to the illness, but also of

determining, both directly and indirectly, the self-assessment of the subjective state of the participants from a number of different points of view.

In close relationship with physical well-being is physical exercise (sports/athletic activities). It was found that all the groups were, in part, physically active, although it was not possible to draw concrete conclusions as to the effects.

The influenza situation in the winter of 1994/1995 (**Figure 2**) was as reflected by the data of the Swiss Federal Office for Health within the SENTINELLA survey carried out by general practitioners. For this survey, the percentage of all visits to the doctor that were associated with influenza/common cold was indicated. On the occasion of the tenth questionnaire «cycle» in the tenth calendar week of 1995, visits to the physician because of influenza/colds in Switzerland attained a level of 3%, with a maximum level for the winter of 1994/1995 of 6% (12th calendar week). It was thus found that the purpose of influenza prevention was, unfortunately, inadequately tested, since the seasonal influenza epidemic peaked very late, that is, at the end of March (week 12) (as compared with week 52 in the winter of 1993/1994).

The less dramatic course and the comparatively low incidence of viral illness within the period investigated, and in particular in the company involved, could of course not be completely predicted in a prospective study. As a result, the relevant

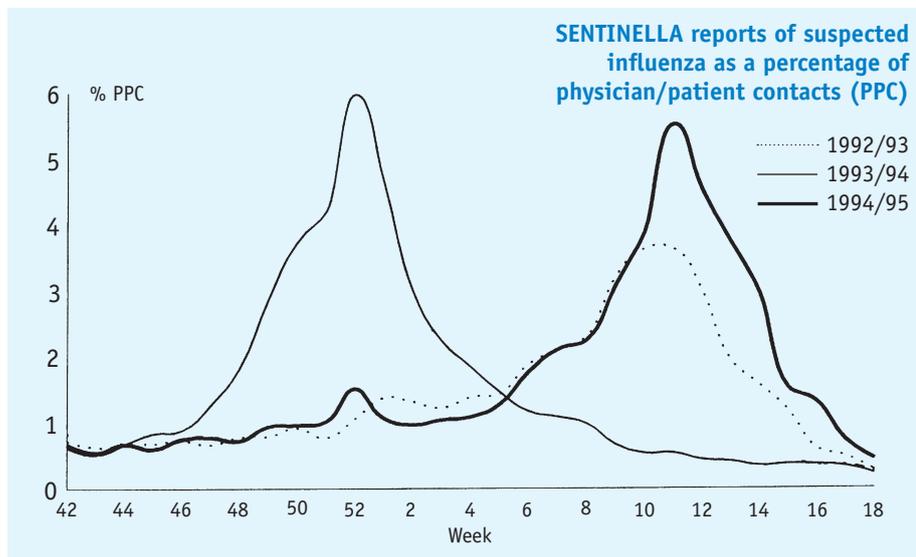


Figure 2: Development of the influenza situation in Switzerland: SENTINELLA reports of suspected influenza as a percentage of physician/patient contacts (PPC) [Swiss Federal Office of Health, Bulletin 18/95].

events in terms of cases of influenza in the study were at a low level, which made evaluation more difficult and also introduced an uncertainty factor with respect to the conclusions drawn. The study covered a total of 22,600 working days, of which only 260 were lost due to illness (1.2%). A projection based on the BIGA figures predicted about 1,400 lost working days for the overall study group (6.2%).

Statistically, the individual diseases in the various groups were too few to permit significant conclusions to be drawn on the basis of the individual data. For this reason, we decided to consider the overall period of the study in the form of a trend. With the aid of a computer, we calculated the trends for the individual groups and compared these with one another. While in the period between October 1994 and March 1995, physician/patient contacts for influenza/colds increased in the general population, most trend curves revealed a decreasing tendency for

the study groups. Of importance is the fact that trend curves are dependent on the Y axis and can thus be compared directly only within the same graphic representation. In order to be able to directly compare the trends for various questions, a ranking within the groups was undertaken. **Table 4** shows this comparison. Rank 1 stands for the best development over the period of the study.

In Minnesota, USA a similar study comprising a vaccination group and a control group was carried out over the same time period in individuals who, recruited by advertisements, volunteered to participate in the study (Kirstin L. Nichol et al.: The Effectiveness of Vaccination against Influenza in Healthy, Working Adults. *New England Journal of Medicine* 333 (14): 889–893, 1995.

Interestingly, a comparison of the two studies revealed a clearly higher incidence of illnesses as well as a considerable loss of working days in the American study. A direct compa-

parison of the control group and the influenza vaccination group in the two studies showed a comparable effect of the vaccination on the number of working days lost, while a comparison of the number of infections in the «influenza vaccination» group and in the controls in the American study showed a clearly better result.

The adoption of a healthy life style brings advantages with it. Thus, the present study shows that merely participating in the preventive program, together with the associated mental occupation with physical health, very probably exercises a favourable influence on the course of an illness. The occurrence of concrete diseases between October 1994 and March, 1995, was, statistically speaking, so rare that in none of the groups could quantitative conclusions be drawn for this area. In contrast, on the basis of our data showing that better results were obtained with the food supplements than in the control group or the group receiving influenza vaccination, unequivocal recommendations for (undertaking) preventive measures can be made for the area of subjective physical well-being.

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Bio-Strath® liquid and
Bio-Strath® tablets both contain
plasmolysed herbal yeast.

Manufacturer:
Bio-Strath AG
Mühlebachstrasse 38
CH-8032 Zurich

	Fever	Days with fever	Influenza/ Common colds
Controls	4	4	3
Influenza vaccination	3	3	4
Bio-Strath® liquid	1	1	2
Bio-Strath® tablets	2	2	1

Table 4: Ranking of the results of the trend analysis (rank 1 = best result)

Effects of a herbal yeast preparation in convalescent patients

Double-blind study involving a herbal yeast preparation (Bio-Strath®) in 177 cancer patients receiving radiation therapy

Within the framework of a double-blind study, the herbal yeast product Bio-Strath® was investigated for its effects in cancer patients receiving radiotherapy. The final evaluation of the results of radiation treatment on the tumour (regression, no change, continued growth) revealed no differences between the two groups. The conclusion is drawn that the Bio-Strath® herbal yeast preparation has no influence on either the growth of the tumour or the action of radiotherapy on the tumour. Rather, it may be concluded that by improving the patient's nutrition or appetite, the Bio-Strath® preparation is capable of ameliorating the short- to medium-term negative effects on physical activity, general condition, weight and haemoglobin, often observed in such patients.

In cancer patients receiving radiotherapeutic treatment, the changes in body weight during the period of treatment serve as an indicator of the extent of the adverse effects associated with radiation treatment. It therefore seemed appropriate to investigate in clinical trials the effectiveness of Bio-Strath in countering such adverse reactions.

Method

The investigation took the form of a double-blind study conducted by PD Dr. med. K.W. Brunner at the oncological ward at the Inselspital in Berne (today the Institute for medical Oncology), in which the clinical infrastructure needed to comply with the requirements of a detailed protocol was available. The justification for this was provided by noteworthy preclinical data. Since the patients in the oncological ward differed widely with respect to diagnosis, the clinical director of the trial took care to include an adequate number of patients and to obtain comprehensive data from each patient. This was done in the hope of providing a solid

inductive basis for a critical evaluation and interpretation of the results of the study.

The study took the form of a double-blind trial involving 100 controls and 100 test subjects. The participants were assigned to each of the groups on the basis of their date of birth: those who were born in a year containing an odd number were assigned to the first group, those whose birth year contained an even number entered the second group.

In one group, the patients received Bio-Strath at a dose of 3 teaspoons a day before meals, while the controls in the second group received the same volume of placebo comprising a syrup of similar consistency and flavour.

For each patient, a record was kept, on a specially designed form, of the previous medical history, laboratory results, subjective self-assessment by the patient, assessment by the physician, details of treatment, and the course of the disease. The collection of these data was concluded with the patient's final examination one month after termination of radiotherapy.

Biometric evaluation

a) Inspection of patient records

In an initial inspection of the data, all those subjects in whom radiation treatment had not been carried out completely in accordance with the treatment schedule, were eliminated, together with all incomplete records. There then remained in the control group 91 of the original 99 patients, and in the test group 86 of the original 101 subjects.

b) Stratification of the control and test groups in accordance with constitutional characteristics of the patients, diagnosis, and total radiation dose.

In the case of clinical double-blind trials involving randomization of patients, there is a certain danger that, in some respect or other, the groups might not be well matched. Differences in the composition of the control and test groups may represent a systematic error and thus falsify the results of the evaluation. To eliminate this risk, the two groups were first compared from different points of view, with the following results:

The two groups were well matched

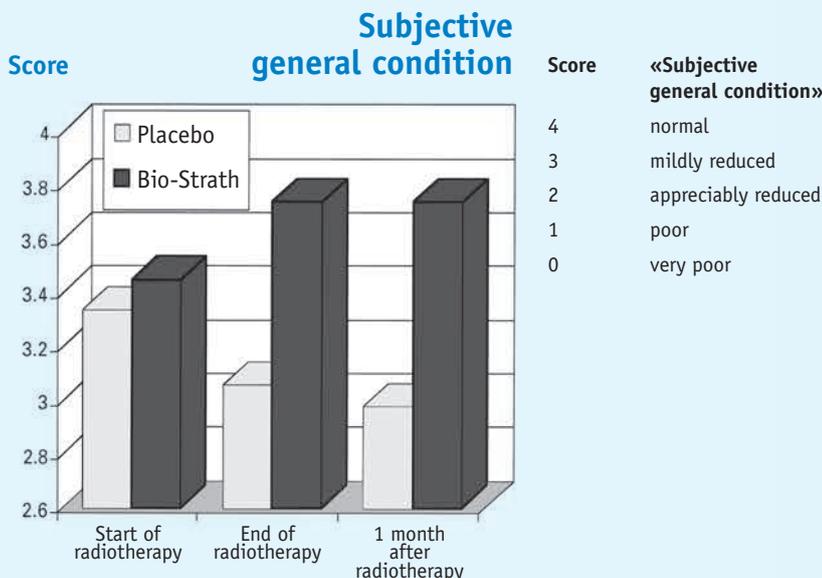
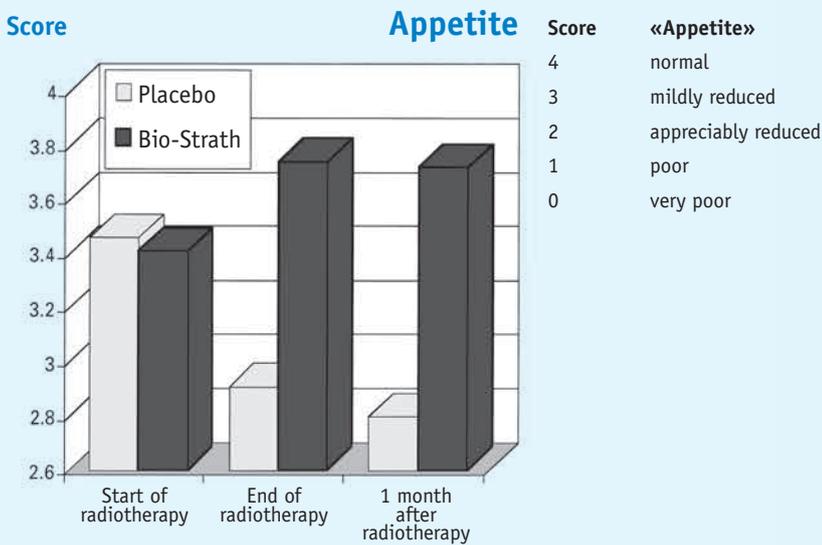
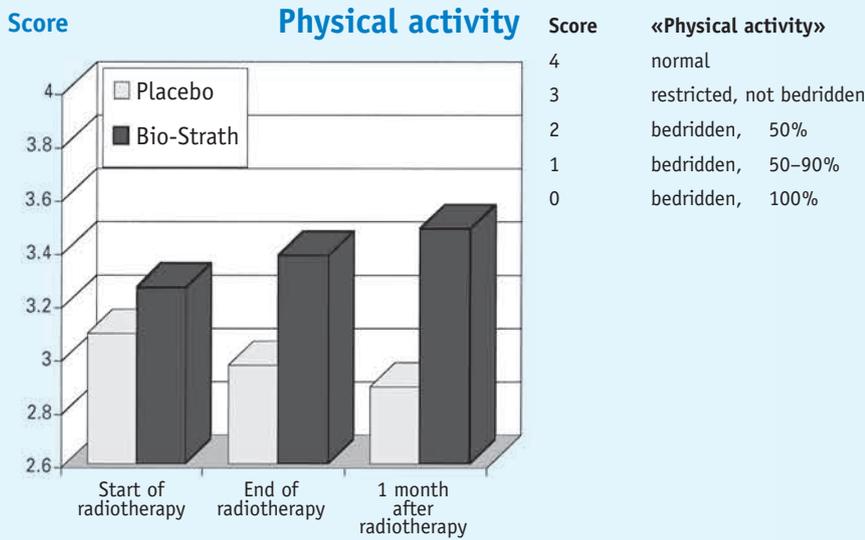


Figure 1: Comparison of the three subjective evaluation criteria «physical activity», «appetite» and «subjective general condition» at various time points. (Placebo: n=91, Bio-Strath: n=86). For the creation of the tables, the averages of the evaluation criteria were used.

for gender and age distribution of the subjects. Patient weight and the start of radiotherapy was also well matched with respect to averages and ranges. The tumour stage at the start of radiotherapy was assessed by the care-providing physician on the basis of a five-point scale. A comparison of frequencies (chi-squared test) indicated a good match for this parameter too. The study director also classified the irradiated tumours into six groups by location. Tumour site distribution in the two groups was also reasonably well matched within the limits of random deviation.

A final comparison revealed intra-group comparability for radiation doses applied, both means and ranges.

Determination of the effects of Bio-Strath

For the comparison of the control and test groups, the following statistical methods were employed (LINDER 1964):

a) Comparison of measured values

- One-tailed analysis of variance (F-test) as described by R.A. FISHER with subsequent t-test to compare paired mean values.
- STUDENT'S t-test for comparison of two mean values.

b) Comparison of relative frequencies.

- Chi-squared test for 2xm tables using the SNEDECOR and IRWIN modification.
- Chi-squared distribution for 2x2 tables with YATES' correction.

Results

a) Activity, appetite, subjective general condition

The first difference between the two groups was found on comparing the self-assessment by the patients of physical activity, appetite and subjective general health. For all three criteria, the data were converted to a 5-point scale (Figure 1).

In the control group, physical activity declined continually from the start of treatment to the end of convalescence (1 month after discontinuation of treatment). Follow-

ing radiotherapy, the patients suffered a marked loss of appetite, which had not improved one month later. Subjective general health also deteriorated considerably during radiotherapy, again showing no improvement after one month of convalescence.

In the *test group*, a striking reversal of this trend was observed.

The patients' subjective self-assessment revealed that physical activity, appetite and general condition were considerably better at the end of treatment and after convalescence than at the start of radiotherapy. Since the double-blind design of the trial excluded possible effects of suggestion by care-providing staff or other patients, the subjective improvements in general health indicated by the patients may be considered to be due to an effect of Bio-Strath. Further biometric evaluation was carried out to objectify the subjective improvements on the basis of countable or measurable criteria.

b) Patient weight

To obtain an overview of weight changes occurring during the trial, individual differences were represented – separately for two periods – in the form of a *histogram illustrating frequency distribution* (Figure 2).

The histogram shows that the patients in the *control group* generally lost weight during radiotherapy, and that this loss became even more evident during the following period of convalescence. In the *test group*, the opposite trend was observed.

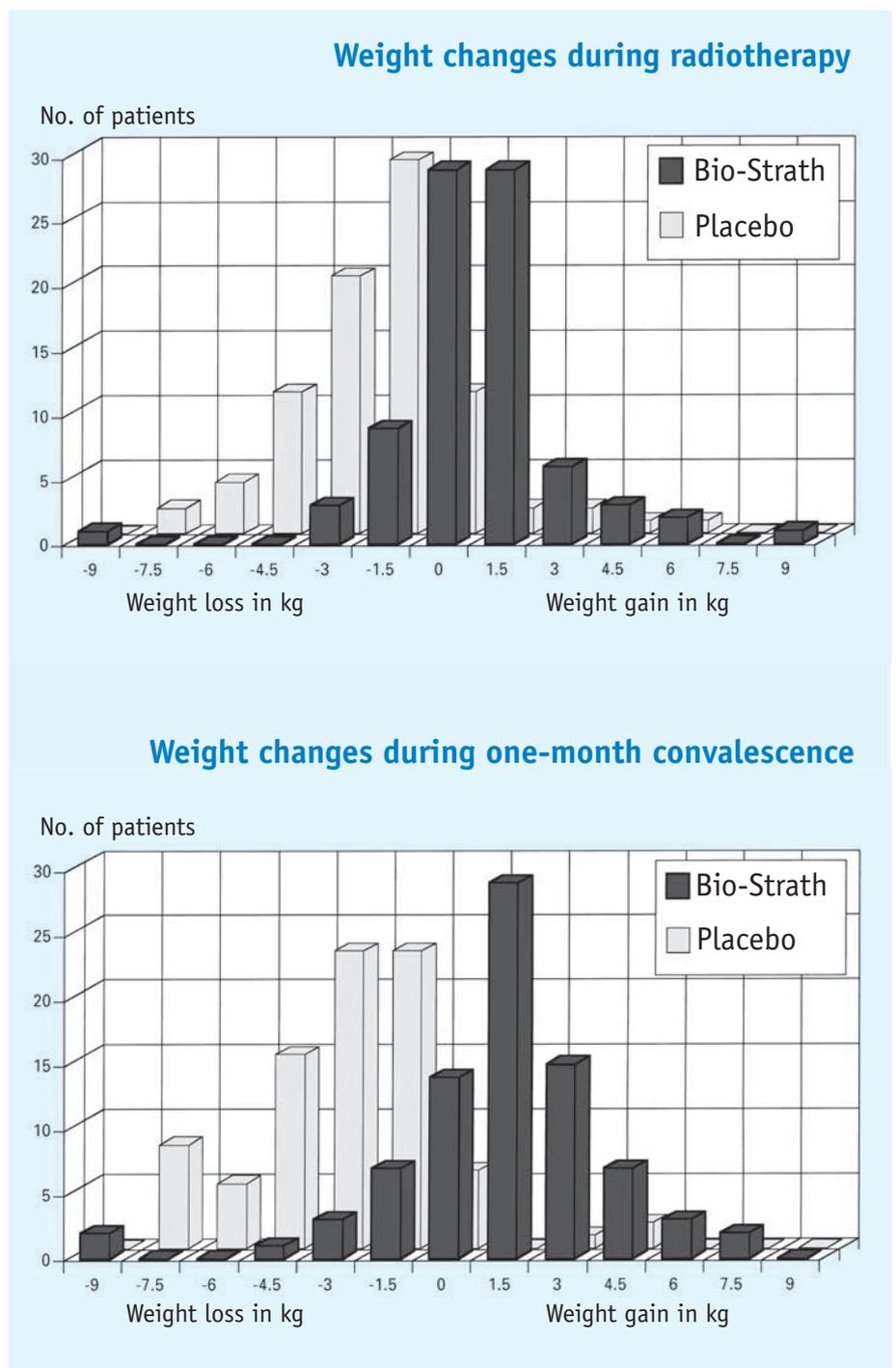


Figure 2: Comparison of changes in average weight (83 patients in each group). Individual differences (for 2 periods separately) are shown grouped together in frequency distribution.

	Control group n=83	Test group n=83	$(x_T - x_K)$	t	p	
Change in weight	\bar{x}_K (kg)	\bar{x}_T (kg)				
During radiotherapy	\bar{x}_1	-2.15	+0.78	+2.93	7.62	<0.01
During convalescence	\bar{x}_2	-3.00	+1.35	+4.35	11.31	<0.01
	$(\bar{x}_2 - \bar{x}_1)$	-0.85	+0.57			
	t	-2.21	+1.48			
	p	<0.05	>0.10			

Table 1: Comparison of changes in average weight of 83 patients in each group. Statistical analysis: One-tailed analysis of variance (LINDER, 1964, p 106) followed by comparison of pairs with the multiple t-test ($s = \pm 2.48$).

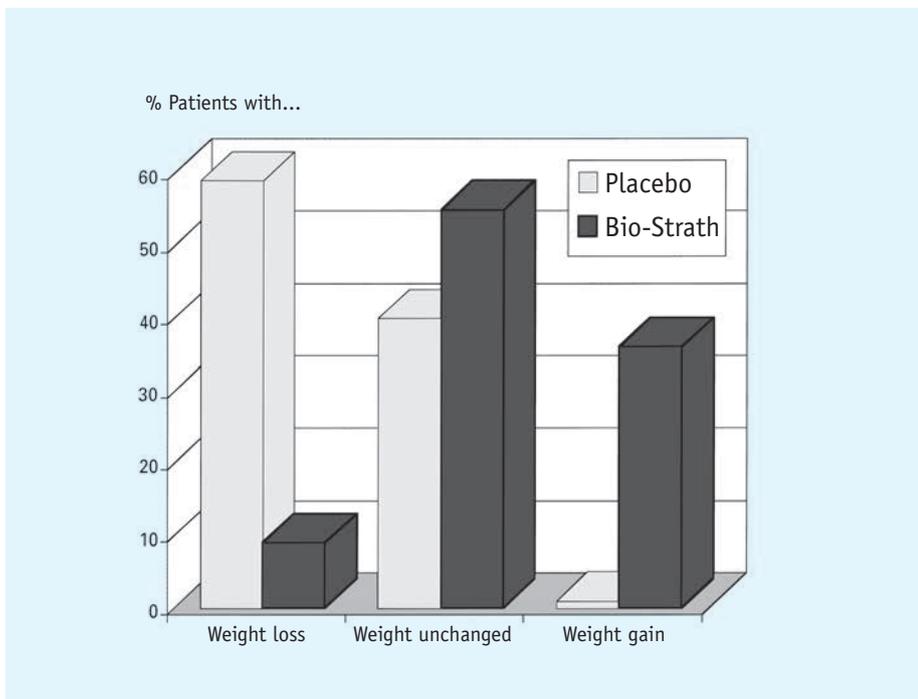


Figure 3: Percentages of irradiated cancer patients with significant changes in weight during the one-month period of convalescence following radiotherapy (Placebo: n=91, Bio-Strath: n=86).

This general impression was confirmed statistically. For each patient, the difference in weight between the start and end of radiotherapy was determined, as also that between the start of the trial and the end of the one-month convalescence period. On the basis of these results, mean values and ranges were determined in the usual manner. **Table 1** shows the results of the biometric comparison of the mean changes. The comparison shows that the patients in the *test group* had a higher average weight than those in the control group, at the end of both the radiation treatment period and the observation period ($p < 0.001$). The fact that the patients were weighed at regular intervals throughout the entire period of the study, made possible a further biometric evaluation. The average weight of the individual patients was established separately for the treatment and convalescence periods, and the two averages were then evaluated during statistical analysis using the t-test (after LINDER, 1964). Using the significance level of $p = 0.05$, the relative number of patients in each

group whose average weight in the convalescence period was significantly higher or lower, was established. These relative rates were then compared with the numbers of patients showing no significant changes in weight.

The results shown in **Figure 3** speak for themselves: The patients in the *test group* showed a clearly more favourable situation with respect to weight during convalescence than did the members of the *control group*. The recorded data clearly show that the regular use of Bio-Strath during treatment and the subsequent period of convalescence had a beneficial effect on patients undergoing radiotherapy in terms of the variable «weight».

c) Haemoglobin levels

Differences between the *control* and *test groups* were also apparent in terms of haemoglobin levels.

To obtain an initial overview, the individual differences for two separate periods were plotted in a graph (**Figure 4**).

The graph gives the impression that haemoglobin levels decreased in the

control group during radiotherapy and subsequent convalescence, while no change was to be seen in the *test group*.

This impression was confirmed by the statistical evaluation. For each individual patient, changes in haemoglobin concentration, both during radiotherapy and the overall duration of the trial, were determined. The mean values calculated from 83 individual measurements in each case, can be seen in **Table 2**.

Evaluation of the results using a one-tailed analysis of variance revealed that haemoglobin levels remained unchanged in the *test group*, while in the *control group*, they decreased continually from the start to the end of the trial. Although at first glance, the differences may appear slight, they are, nevertheless, statistically significant ($p < 0.001$).

From the graph shown in **Figure 4**, the number of patients in whom a positive or negative change in haemoglobin level of at least 8% occurred, was determined. The establishment of this limit was derived from the selected class range in the grouped incidence distributions seen in **Figure 4**, the three central classes being arbitrarily taken as a range with no major changes. This corresponds reasonably well with clinical experience, where changes of $\pm 5\%$ Hb are considered significant.

The assignment carried out led to the results illustrated in **Figure 5**. At the end of the radiation treatment period, small differences first appeared in the percentage of patients with a considerable decrease in haemoglobin levels ($p < 0.05$). At the end of the one-month period of convalescence, however, the difference had become more marked ($p < 0.001$). The comparisons show that regular use of Bio-Strath by cancer patients undergoing radiotherapy prevented the decrease in haemoglobin levels during radiotherapy and the subsequent one-month period of convalescence.

d) Other laboratory results

Mean values and standard deviations were also determined for a number of other laboratory results obtained at the start of treatment, and the

end of irradiation and on conclusion of the trial. The results of these calculations are shown in **Table 3**. The biometric assessment revealed the following results:

In neither of the two groups was the *alkaline phosphatase activity* affected by treatment. Within the limits of random variations, the mean values were in agreement, at all time points, in both the control and test groups.

In both groups, the *average urea concentration* remained constant for the duration of the trial; no significant differences were to be seen between *control* and *test groups*.

At the start of the trial, the average values of the two *serum transaminases SGOT* and *SGPT* in the *test group* were lower than in the *control group*, in which a number of patients had unusually high levels. During the course of radiotherapy and the period of convalescence, however, the average activities of the two enzymes changed in neither of the two groups.

During the course of the trial, the number of *platelets* (platelet count) decreased somewhat in both groups, but the decrease was identical in both *control* and *test groups*.

For reasons unknown, the *leukocyte count* showed variations that went beyond the usual limits of error of the determination method. For this reason, only the mean values were included in **Table 3**. There was no evidence of any difference between control and test groups.

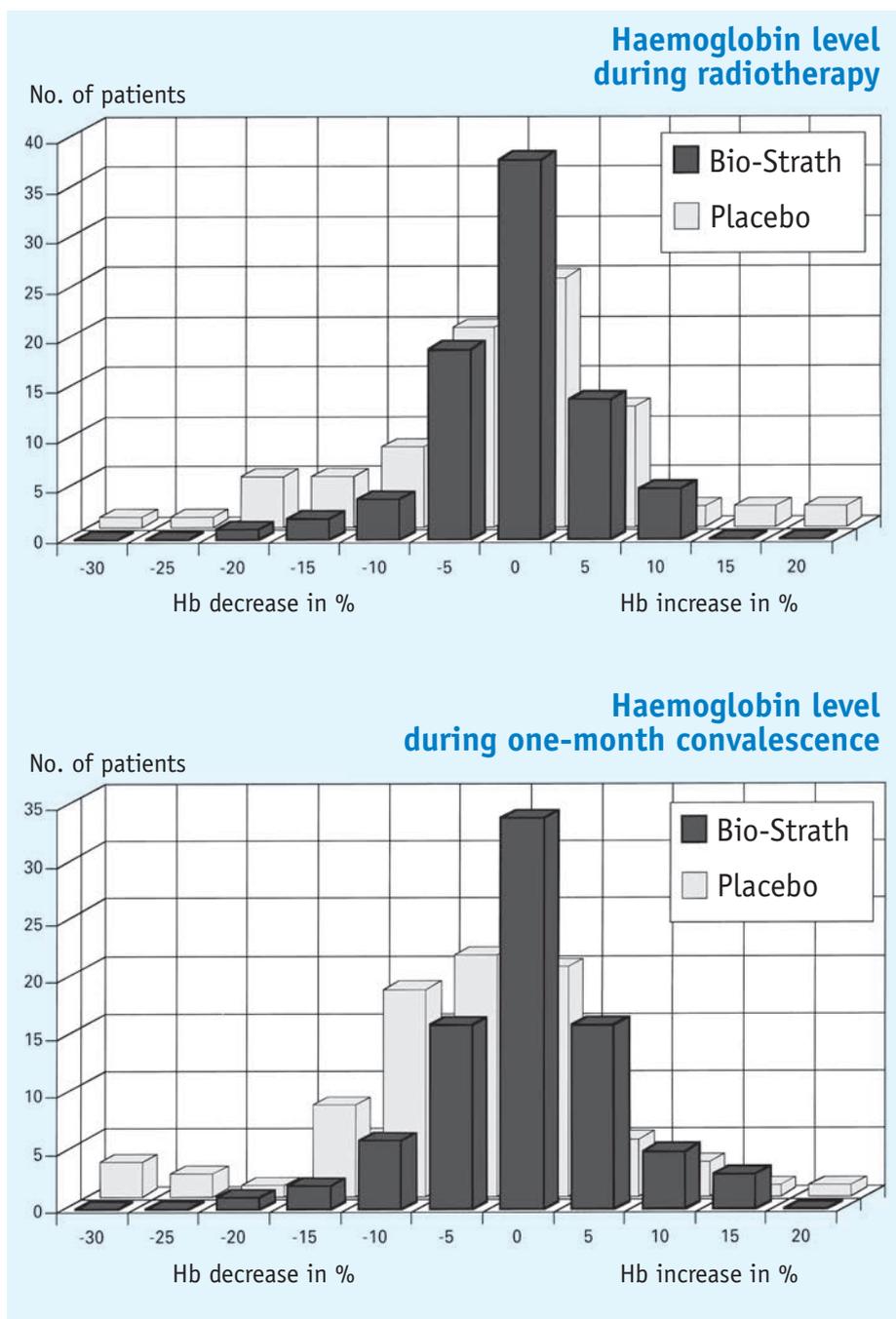
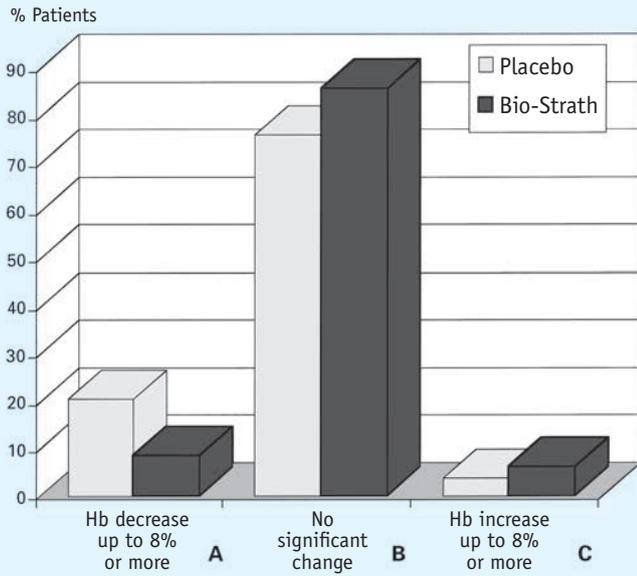


Figure 4: Comparison of changes in average haemoglobin levels for two groups of 83 patients each. The individual differences for two separate periods have been plotted.

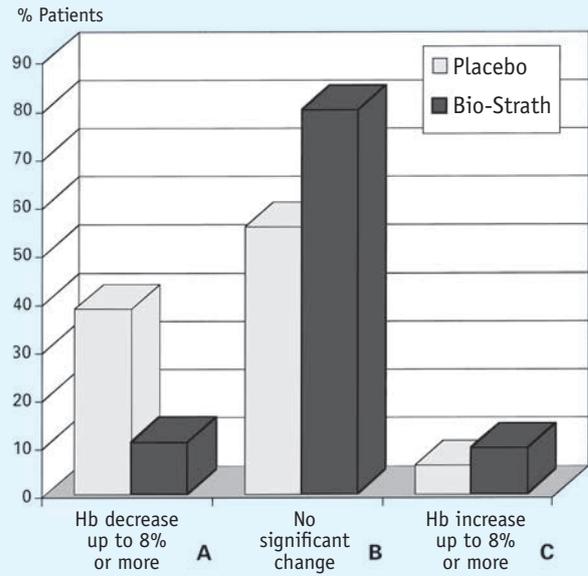
	Control group n=83	Test group n=83	$(X_T - X_K)$	t	p
Change in haemoglobin levels	\pm_k (%)	\pm_T (%)			
During radiotherapy	\pm_1 -3.13	-0.78	+2.35	4.94	<0.001
During convalescence	\pm_2 -5.66	-0.18	+5.46	11.51	<0.001
	$(\pm_2 - \pm_1)$ -2.53	+0.60			
	t -5.31	+1.26			
	p <0.001	>0.20			

Table 2: Comparison of changes in haemoglobin levels of 83 patients in each group. Statistical analysis: One-tailed analysis of variance (LINDER, 1964, p 106) followed by comparison of pairs with the multiple t-test ($s = \pm 3.06$).

Start to end of irradiation



Start to one month after irradiation



Figur 5: Patients showing marked changes in haemoglobin levels (compared with baseline) during radiotherapy (Placebo: n=83, Bio-Strath: n=83). Statistical analysis: Chi-squared test for two-by-two table with frequencies pooled (B+C) and YATES' correction (LINDER 1964, p 76). Results: Start to end of irradiation $\chi^2 = 3.9$ p < 0.05 differences significant; Start to end one month after irradiation $\chi^2 = 15.6$ p < 0.001 differences significant

e) Comparison of the results of tumour treatment in the two groups

To determine whether the administration of Bio-Strath had in any way influenced the results of radiotherapeutic treatment, a comparison was made of the results obtained in the two groups (Figure 6).

Blind evaluation by the care-providing physician revealed no differences between the two groups.

Conclusions

The results of the double-blind study clearly show that the regular administration of Bio-Strath liquid (3 teaspoonfuls per day) improved the subjective general condition of cancer patients receiving radiation treatment over a lengthy period of time, in several respects.

On the basis of self-assessment, patients in the *test group* suffered less from such adverse effects as anorexia and fatigue, while their general state of health was considerably better than that of the *controls*.

Among the measurable variables, in

particular the difference in the weight of the individual patients is worth mentioning. The weight of the patients in the *test group* increased during treatment and subsequent one-month convalescence by 1.35 kg, which contrasted with an average decrease in the *controls* of 3.00 kg (total difference 4.35 kg).

Furthermore, the use of Bio-Strath also prevented a decrease in haemoglobin levels during radiotherapy and subsequent convalescence.

Changes in the platelet count were similar in both *control* and *test groups*.

During irradiation and convalescence, the concentration of urea, as also the activities of the serum enzymes alkaline phosphatase, SGOT and SGPT remained unchanged from baseline in both groups.

The final evaluation of the results of radiation treatment on the behaviour of the tumour (regression, no change, continued growth), revealed no differences between the two groups. The conclusion is drawn that the Bio-Strath herbal yeast prepara-

tion has no influence on either the growth of the tumour or the action of radiotherapy on the tumour. Rather, it may be concluded that by improving the patient's nutrition or appetite, the Bio-Strath herbal yeast preparation is capable of ameliorating the short- to medium-term negative effects on physical activity, general health, weight and haemoglobin, often observed in such patients.

Parameter	Time	Control group		Test group	
		n	x±s	n	x±s
Alkaline phosphatase (IU)	Start of radiotherapy	76	33.8±13.3	76	34.3±11.9
	End of radiotherapy	76	33.9±13.2	76	33.3±13.9
	One month after end of irradiation	76	34.6±12.5	76	31.9±12.8
SGOT (IU)	Start of radiotherapy	77	13.1±9.2	76	11.7±3.8
	End of radiotherapy	77	13.3±5.9	76	11.7±4.5
	One month after end of irradiation	77	13.5±6.9	76	12.3±4.0
SGPT (IU)	Start of radiotherapy	77	10.4±7.1	76	9.6±3.9
	End of radiotherapy	77	10.9±8.3	76	9.7±4.6
	One month after end of irradiation	77	11.4±9.0	76	10.2±4.4
Urea (mg%)	Start of radiotherapy	76	32.9±9.8	76	33.5±7.7
	End of radiotherapy	76	33.6±10.1	76	33.9±8.4
	One month after end of irradiation	76	33.4±7.9	76	33.7±7.2
Platelets (N · 10 ³ /mm ³)	Start of radiotherapy	83	210±73	80	215±67
	End of radiotherapy	83	187±48	80	197±52
	One month after end of irradiation	83	183±51	80	191±57
Leukocytes (N/mm ³)	Start of radiotherapy	88	6890	87	6880
	End of radiotherapy	88	6150	87	6230
	One month after end of irradiation	88	6530	87	6670

Table 3: Comparison of laboratory results showing no significant changes during the course of the trial.

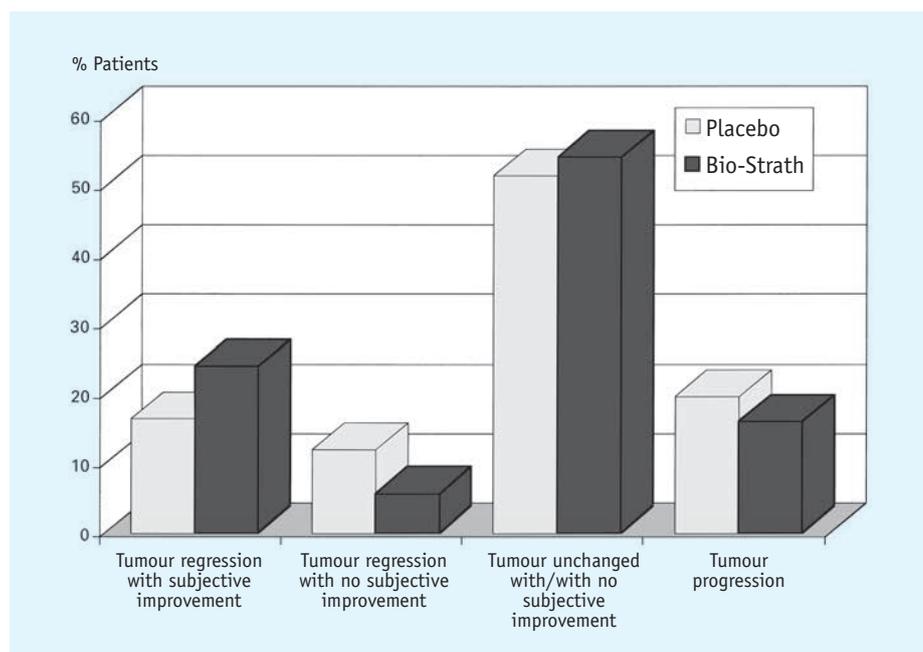


Figure 6: Comparison of final assessment of the effects of tumour treatment (Placebo: n=91, Bio-Strath: n=86).

Statistical analysis: Chi-squared test modified by SNEDECOR and IRWIN 1933 (LINDER 1964, p. 72).

Results: $\chi^2 = 6.68$; degree of freedom = (4-1) (2-1) = 3; $p > 0.05$. The percentages within the two groups agree within the limits of random variation.

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Bio-Strath® is a plasmolysed herbal yeast preparation manufactured by Bio-Strath AG, Mühlebachstrasse 38, CH-8032 Zurich.

Supportive treatment with a herbal yeast preparation in oncologic systemic therapy

Field trial relating to «quality of life», conducted in an oncology group practice

Structure of the study

The planned structure was an open, self-referring, non-randomised study of cancer patients undergoing systemic chemotherapy. It was assumed that it would be possible to compare the active treatment group with a contrast group. However, since more than 80% of the 42 patients chose to be part of the active treatment group, the design had to be amended to an intra-individual controlled study with matched pairs.

The study period covered 5 visits within 16 ± 1 weeks. A questionnaire was completed at every visit.

We used the questionnaire developed by the European Organisation for Research and Treatment of Cancer (EORTC QLQ-C30, V3.0) to investigate the influence of Bio-Strath® on quality of life and quantify this influence. This questionnaire contains 30 questions that, apart from the «Global Quality of Life» (1 to 7 points, «very poor» to «excellent»), is also subdivided into 5 function scales (physical functioning, role functioning, emotional functioning, cognitive functioning and social functioning) and 9 symptom scales (nausea and vomiting, pain, fatigue, dyspnoea, insomnia, appetite loss, constipation, diarrhoea and financial difficulties), to be answered with «none», «mild», «moderate» or «severe».

This questionnaire is the most commonly used worldwide in the field of oncology. It is psychometrically robust and suitable both for different types of cancer and for diverse cultural groups.

Statistics

Evaluation of the EORTC questionnaire was planned as a “case control” study. Since the patients were able to choose the group in which they wanted to be included (Bio-Strath® or control), there was an imbalance of 35:7 in favour of the active

treatment group (Bio-Strath®). In order to allow evaluation in spite of this, 7 pairs were formed (one partner without Bio-Strath®, one partner with Bio-Strath®), in which the partners matched in terms of the following parameters:

- Diagnosis
- Symptoms
- Therapy
- Gender
- Age

Results

The questionnaires were evaluated strictly in accordance with the EORTC instructions. The results obtained were converted into graphs. Since the patients' condition altered in both directions in the course of the five visits, we selected the linear gradient as a measure of comparison for the complex curves. High values are better (**Figure 1**).

The gradients of the trend lines for all the study pairs are shown in **Table 1**. The better value for each pair is shown in blue.

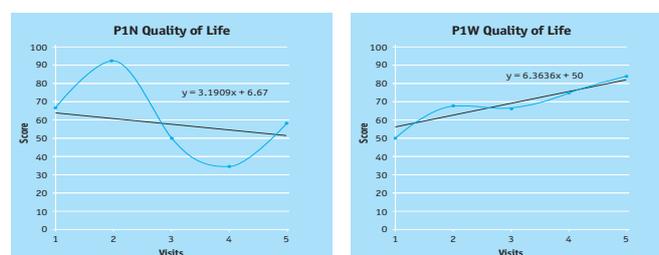


Fig. 1: Two examples of “Quality of Life” curves with trend calculation (straight line) over 5 visits. P1N no Bio-Strath® ($x = -3.19$), P1W with Bio-Strath® ($x = +6.36$).

Pairing the test subjects*	P1N	P1W	P2N	P2W	P3N	P3W	P4N	P4W	P5N	P5W	P6N	P6W	P7N	P7W
Gradient of the QoL curve	-3.2	6.4	1.5	-0.6	5.4	6.4	-0.3	4.3	-5.2	0.6	2.4	2.4	-4.1	1.4

* N at the end: no product; W at the end: with product

Table 1: Gradient of the QoL trend over 5 visits. Bio-Strath® scored better in 5 of 7 pairs.

Function scales

The 5 function scales were calculated for each patient, again using curves and as the trend of the gradient.

Table 2 shows the gradients for the 7 pairs. High values represent increasing well-being. The better value for each pair is shown in blue.

The numerical differences in gradients do not in themselves provide much information about the medically relevant improvements. Osoba et al. (1998) discovered that study participants with a difference of between 10 and 20 EORTC points feel «somewhat better», while those with a difference of more than 20 EORTC points feel «very much better». King (1996) performed a meta-analysis of 14 papers and found that a QoL difference of 16 EORTC points is unequivocally medically relevant.

We plotted the clinically relevant changes (EORTC points) determined by Osoba and King in the gradients we had calculated. The comparison of clinically relevant changes is shown in **Figure 2**.

Symptom scales

The EORTC questionnaire also asks about physical symptoms. As in the case of the QoL scale and the function scales, the evaluation was made by calculating the linear gradient of the complex curves over the 5 visits. Low values represent decreasing symptoms. The better value for each pair is highlighted in blue (**Table 3**). The corresponding evaluation is shown in **Figure 3**.

Pairing the test subjects*	P1N	P1W	P2N	P2W	P3N	P3W	P4N	P4W	P5N	P5W	P6N	P6W	P7N	P7W
Physical functioning	5.1	-0.6	0.3	-1.7	1.7	6.2	-0.3	0.3	-0.5	1.7	-3.2	2.3	-0.8	1.1
Role functioning	-1.9	2.9	9.8	-0.4	1.3	15.8	0.2	0	5.5	0.7	2.3	8.3	0	0
Cognitive functioning	-2.6	-0.6	-5.5	1.4	-0.5	-1.7	-2.9	0	4.3	1.6	0	5.1	2.6	-2.7
Emotional functioning	-5.5	-0.4	0.3	2.0	0	-3.5	-3.7	2.0	-2.1	6.3	2.8	11.9	1.9	2.7
Social functioning	-0.1	7.3	-4.8	0.2	2.8	1.0	-2.3	0	0	3.6	-2.0	-1.6	-1.7	0

* N at the end: no product; W at the end: with product

Table 2: Gradients of the trend lines for functioning.

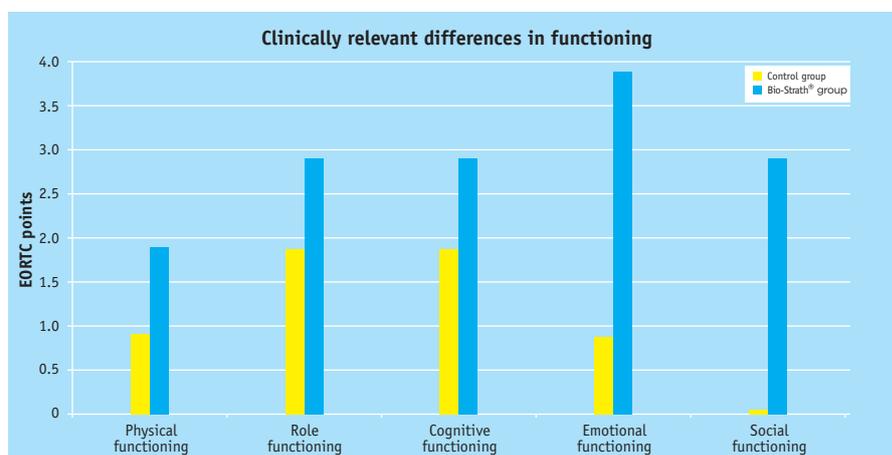


Fig. 2: The test subjects with Bio-Strath® scored better with respect to all functions. This was particularly impressive in the emotional and social functioning parameters.

Pairing the test subjects*	P1N	P1W	P2N	P2W	P3N	P3W	P4N	P4W	P5N	P5W	P6N	P6W	P7N	P7W
Nausea and vomiting	0	0	0.9	0	-3.3	0	6.4	0	4.5	2.4	-7.0	-10.0	0	0
Pain	0	6.1	-0.9	0.6	0	-11.8	2.7	0	0	-11.5	-8.5	-3.0	-5.1	0
Fatigue	0	-3.8	-1.6	-1.0	-2.8	-4.8	2.4	-2.8	-4.7	-4.3	-7.9	-8.9	3.0	-3.2
Dyspnoea	6.1	8.5	7.3	3.0	0	3.0	-8.5	0	-3.6	3.0	5.5	-6.1	0	0
Insomnia	-6.7	-1.2	4.9	0	0	-3.0	3.0	0	0	-5.5	-22.4	-13.9	0	3.0
Appetite loss	-3.0	0	3.6	0	-2.4	-17.0	1.8	0	10.3	1.2	3.4	-12.1	-6.1	0
Constipation	-11.5	-17.0	-6.1	0	-5.4	0	0	0	0	0	-23.0	1.2	1.2	0
Diarrhoea	-6.1	1.2	-2.4	8.5	0	0	4.2	0	6.1	-6.7	8.5	-3.0	0	0
Financial difficulties	0	3.0	0	-4.2	0	0	0	0	0	-7.3	0	-8.5	0	0

* N at the end: no product; W at the end: with product

Table 3: Improvement or deterioration of physical symptoms based on gradient values. Low values are better.

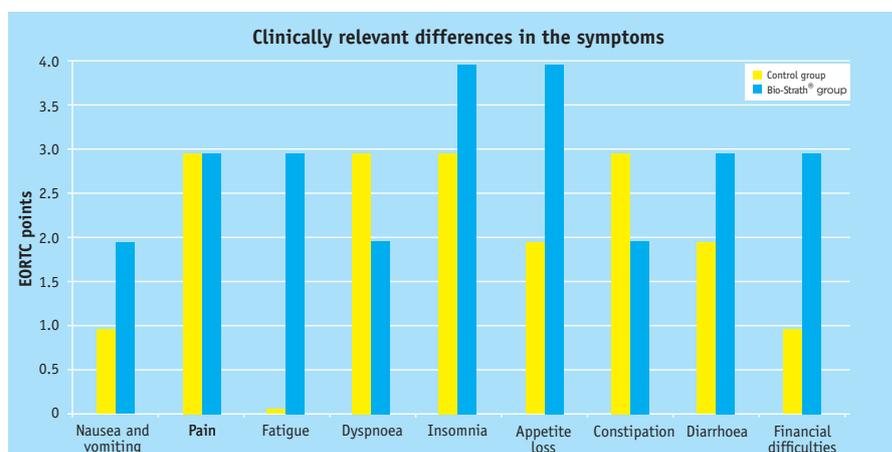


Fig. 3: Patients taking Bio-Strath® had markedly better scores, particularly with respect to the following symptoms: fatigue, financial difficulties, nausea and vomiting, and appetite loss.

Discussion

We should like to point out that in this study it was never a question of having a direct influence on the course of the disease. Bio-Strath® was used solely for the purpose of maintaining quality of life as high as possible during the aggressive chemotherapy. The figures obtained speak in favour of Bio-Strath®.

Furthermore, it was very positive, although not unexpected, to note that the adjuvant treatment with the herbal yeast product did not result in any objective or subjective adverse reactions.

Our explorative study yielded indications suggesting that the null hypothesis – that a suitable food supplement does not bring about any improvement in quality of life – was not applicable. We therefore believe that taking appropriate, additional products has been shown to be positive in some aspects for patients undergoing systemic cancer treatment, and can therefore be recommended.

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The literature references and the questionnaire may be requested from the authors.

Hemoglobin values during pregnancy

Observation on the effect of the herbal yeast preparation Bio-Strath® on the hemoglobin level in pregnant women

The objective of this study is to determine and confirm the benefits of taking the herbal yeast preparation Bio-Strath® during pregnancy, specifically with respect to maintaining hemoglobin (Hb) levels, as well as a feeling of well-being among expectant mothers.

The study showed that Bio-Strath® appears to be able to effectively maintain the hemoglobin levels of expectant mothers throughout pregnancy without additional vitamin or iron preparations. Bio-Strath® also helped to maintain a general sense of well-being and vitality in these women.

It is known that the iron turnover in expectant mothers is up to three times that of an average adult. This is reflected in lower hemoglobin levels. The study showed that hemoglobin levels can be maintained by taking Bio-Strath®, provided that the patients' diet contains adequate fresh fruits and vegetables, whole grains, lean meats and dairy products, and the expectant mothers abstain from cigarettes and alcohol.

Method

Thirty-one women agreed to participate in the Bio-Strath® study. When enrolled in the study all participants apparently were in good health with hemoglobin levels in the normal range between 120 and 130 g Hb/l. Participants were instructed to take one teaspoon of Bio-Strath® three times daily, in place of other prenatal multi-vitamins.

It was also recommended to include fresh fruits and vegetables, whole grains, lean meats and dairy products in their diet and abstinence from cigarettes and alcohol. Hemoglobin levels characteristically were checked before starting to take Bio-

Strath® at the beginning of the pregnancy, at 24 weeks, at 30 weeks and at 36 weeks of pregnancy.

Results

21 expecting mothers maintained their normal hemoglobin levels during pregnancy and continued taking Bio-Strath® until delivery. Their hemoglobin was tested once more approximately 3 or 4 weeks before delivery, and all had stayed within normal range. As well all women described their energy level as being excellent.

One patient chose to discontinue Bio-Strath® after her 24-week examination, opting instead to take a herbal iron supplement. When tested again at 30 weeks, her hemoglobin level has dropped to 110 g Hb/l from a previous value of 130. After learning these results, she resumed taking Bio-Strath® for the remainder of her pregnancy, and when tested 3 weeks before delivery, her hemoglobin level was back to normal.

Three further patients came for first consultations at 9 weeks. They were taking a prescribed prenatal vitamin. Their hemoglobin levels were approx-

imately 115 g Hb/l. All three commented that their energy was somewhat low and constipation had become a concern caused by the prescribed prenatal vitamin. Their prenatal vitamin was replaced by Bio-Strath® and dietary suggestions were given. At 24 weeks, hemoglobin levels had increased to 120 g Hb/l. Approximately 6 weeks prior to delivery hemoglobin levels remained stable, energy levels consistent and constipation was no longer a problem since discontinuing the prenatal vitamin.

Three more patients at 24 weeks showed decreased levels of hemoglobin, approximately 100 g Hb/l. After carefully reviewing their diets it was obvious they had not followed the dietary suggestions. Patients were instructed to take Bio-Strath® and increase their intake of green vegetables, liver twice weekly, sultana raisins and blackstrap molasses. At 30 weeks, hemoglobin levels were increasing and at around 4 weeks prior to delivery hemoglobin levels were approximately 117 g Hb/l.

One patient was unable to take Bio-Strath® due to nausea and discontinued it almost immediately.

One other patient's hemoglobin level had dropped to 95 g Hb/L, representing mild anemia. However, she had a previous history of anemia before pregnancy, as well as complications with the pregnancy, and emotional upset.

One additional patient did not respond to Bio-Strath® regardless of her diet. Iron supplement was required. This patient suffers from diabetes type A requiring daily insulin.

Conclusion

Bio-Strath® appears to be able to effectively maintain the hemoglobin levels of expectant mothers throughout pregnancy without additional vitamin or iron preparations. Bio-Strath® also helped to maintain a general sense of well-being and vitality in these women. It also appears that when anemia is occurring, requiring iron supplementation, the addition of Bio-Strath® can enhance the assimilation of the supplement. Bio-Strath® cannot be considered an iron supplement although it contains 61 vital substances (19 minerals/trace elements, 11 vitamins, 20 amino acids and 11 various vital substances) and among them iron in a natural form. However, the unique process by which it is prepared – yeast cells are combined with specifically selected herbal extracts, then liquefied in a fermentation process (plasmolysis), thus releasing all the active substances in a readily absorbable form – can enhance the body's ability to assimilate iron from a normal, healthy diet, as well as improving assimilation of iron supplementation, seems to exert a favourable effect on the body's metabolism. Consequently it can also be assumed that many other essential nutrients as well are being incorporated better. A food supplement that causes a chemical reaction or speeds up an event by its presence, can be considered as a catalyst. The results documented during this study are confirmatory, and would suggest that Bio-Strath® is a food supplement that has a catalytic action. Bio-Strath® is a herbal yeast food supplement manufactured by Bio-Strath AG, Zurich, Switzerland.

What is Bio-Strath®?

Bio-Strath® is a natural herbal yeast preparation taking the form of a unique combination of yeast and herbs, manufactured in accordance with a special procedure, which is available in both liquid and tablet form.

Bio-Strath® is rich in

- vitamins (e. g. vitamin C, riboflavin B₂, pyridoxine B₆, cobalamin B12, pantothenic acid, folic acid (folate),
- minerals (e.g. Ca, K, Na, Mg, Fe, Se, Cu, Mn, Zn),
- amino acids (e.g. alanine, asparagine, glutamine, leucine, isoleucine, valine, choline, tryptophan),
- nucleic acids (DNA, RNA),
- numerous major building materials such as lecithin, L-carnitine and coenzyme Q, as also glucan and mannan for strengthening the immune system.

The effect of Bio-Strath® is based on the totality of its constituent substances.

Bio-Strath® contains no synthetic additives.

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A list of references may be requested from the authors.

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Tolerance and efficacy of Bio-Strath® Food Supplements Liquid and Tablets in 390 children aged between 1 and 14 years

The tolerance (absence of adverse reactions) and efficacy of the Bio-Strath Food Supplements has already been demonstrated in many controlled studies, the majority of which, however, refer to adults.

Questionnaires have been enclosed in the Bio-Strath Food Supplement packs since 1976. Those questionnaires returned over the fifteen-year period include observa-

tions relating to 390 children aged between 1 and 14 years, of whom 304 took Bio-Strath liquid (Elixir) Food Supplement and 86 Bio-Strath Tablets over periods ranging from one month to several years. Voluntary reports generally result in a scatter in the responses since it is chiefly consumers who are enthusiastic or disappointed who reply, and rarely those who are simply satisfied. However, the range of these docu-

ments permits analysis of tolerance and efficacy.

Tolerance was good, although problems relating to the taste were mentioned in a few cases (1%).

Most of the consumers confirmed good efficacy. The greatest improvements were noted with respect to fatigue, poor concentration, increasing the immune defense system and convalescence.

Study design

Children from the following age groups were given Bio-Strath® Elixir/Food Supplement or Tablets:

Age group	Elixir/liquid	Tablets	Total
1 – 3 years	17	–	17
4 – 6 years	44	3	47
7 – 9 years	97	27	124
10 – 12 years	130	45	175
13 – 14 years	16	11	27
Total	304	86	390

The daily dose was between 1 and 3 teaspoonfuls or 1 and 6 tablets.

The period over which the supplement was taken ranged from one month to several years, with a mean of about six months:

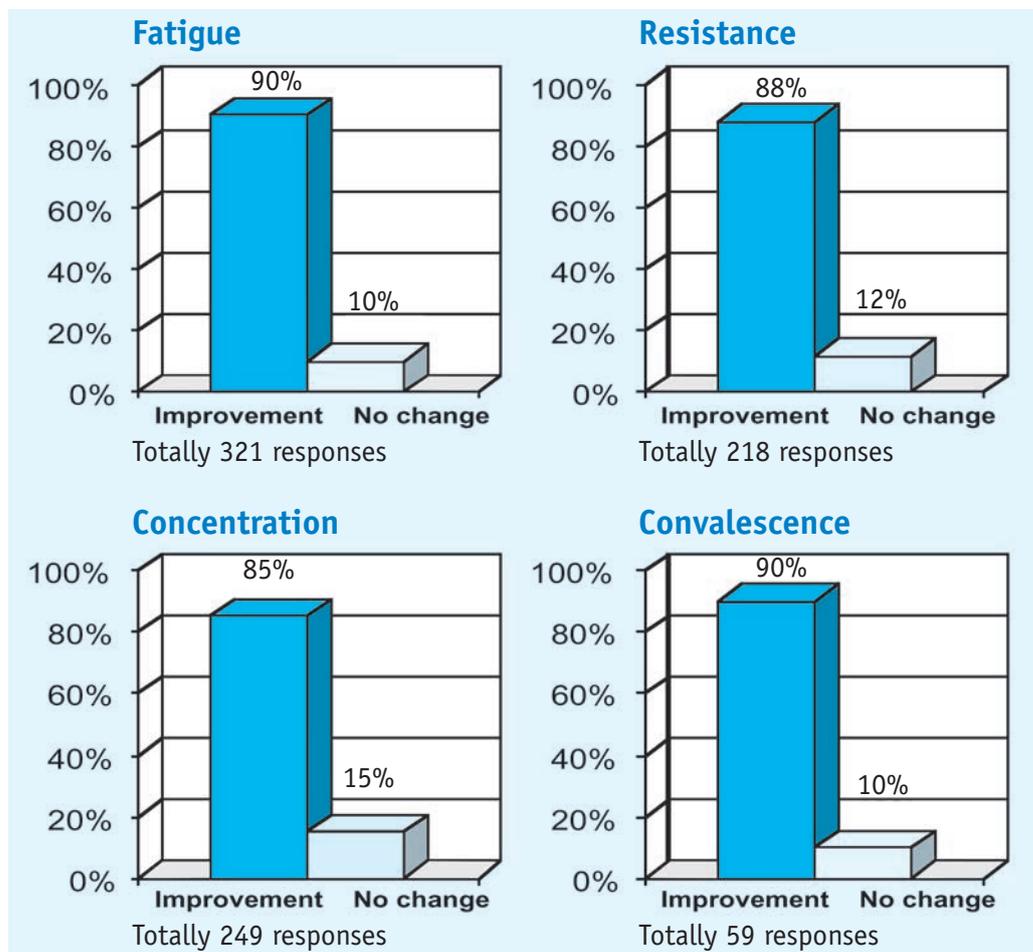
Taken for	Elixir	Tablets	Total
up to 1 month	73	9	82
2 months	50	9	59
3 months	25	6	31
4 months	8	12	20
5 months	2	5	7
6 – 12 months	24	12	36
several quarters	30	1	31
several winters	25	3	28
several years	43	10	53
No data	24	19	43
Total	304	86	390

Results

Efficacy

The questionnaire asked about the following problem groups: fatigue, susceptibility to infection, powers of concentration and convalescence. The results, showing improvements of between 85% and 90%, are remarkable.

Effect on:



Positive effects relating to activity, stress, appetite, balanced moods, sleep and general health were also mentioned.

Tolerance

The tolerance of the Food Supplement was good, i.e. raising no comment, in 99% of the cases.

Taste

Problems relating to taste were reported by 5 (1%) children or their parents.

Taste	Elixir	Tablets	Total	%
No data	258	84	382	98
Acceptable	3	-	3	1
Bad	3	2	5	1
Total	304	86	390	100

Conclusion

Bio-Strath® Food Supplements can be used very successfully for children either as liquid (Elixir) or tablets. The analysis demonstrates that the products have shown very good efficacy. Tolerance is good or very good in almost every case. No complications resulting from taking the preparation have been noted. The taste was classified as good or acceptable by 99% of the children.

Influence of a food supplement on the behaviour of children with attention deficit disorders (ADD/ADHD)

Application study with the herbal yeast preparation Bio-Strath® in children

Summary

The problem of the increasing number of children with attention deficit problems (ADD/ADHD) needs to be tackled. Although methyl phenidate (e.g. Ritalin®, Concerta®) has been shown to be an effective treatment, it by no means solves all the problems.

Bio-Strath® Food Supplement (Bio-Strath® AG, Zurich [A]) has been known and scientifically studied over many years, and in a welcome development, its possibilities for an effect in connection with ADD/ADHD have now been investigated.

Eighteen children in a paediatric practice were included in this pilot study. In addition to subjective assessments by the doctor, parents and teachers, this study was backed up by an American computer program (IVA CPT [B]) that has been recognised for many years. This program objectively records the visual and auditory performance of the children involved and is capable of comparing performances at different times.

The results show that the majority of the subjects studied benefited both subjectively and objectively from taking Bio-Strath® Food Supplement.

Introduction

Attention deficit disorders in childhood are an increasingly serious problem for the children affected, their parents and teaching staff involved. According to a study carried out by the American National Institute of

Health in 2000, 3 to 5 per cent of all children are thought to suffer from an attention deficit disorder. Articles highlighting these disorders appear in the press almost every week, and the topic can be found discussed increasingly in professional journals. A search for ADHD on the internet produces more than 2 million references.

Previous studies with Bio-Strath® Food Supplement suggest (1–6) that taking the product improves attentiveness and concentration in healthy and behaviourally disturbed schoolchildren and adults. It was therefore reasonable to think in terms of linking Bio-Strath® Food Supplement to a possible improvement in attention deficit disorders.

In Switzerland, attention deficit and hyperactivity disorders are often described using English abbreviations. ADHD stands for «Attention Deficiency, Hyperactivity Disorder». In some of the children concerned, emphasis of the dysfunction may lie either more on attention deficit (ADD, «Attention Deficiency Disorder») or on hyperactivity (HD, «Hyperactivity Disorder»). According to the American Diagnostic and Statistical Manual of Mental Disorders of the American Psychiatric Association, DSM-IV [C] a distinction is made between three subtypes: «predominantly inattentive», «predominantly hyperactive/impulsive» and a «combination» of the two. Psychologists report that gender-specific differences can be observed among affected children with respect to the nature and severity of the

symptoms. At present, after diagnosis by educational psychologists and paediatricians, those affected are generally successfully treated with the drug methyl phenidate (Ritalin®, Concerta®). However, there are a number of reasons why this drug should not be prescribed too readily or for a long period of time.

The causes of ADHD may be various. Current opinion considers a genetic cause likely since ADHD very often occurs more than once in a family. This has also been confirmed in studies of twins. The Attention Deficit Hyperactivity Disorder Molecular Genetics Network has been collecting relevant data since 1999.

Study design, patient group and methods

The study was designed as an open application study with each test subject at the same time being his or her own control. The results from the first assessment before taking the product served as the basis for the investigations in the course of the trial. Subsequent assessments were intended to demonstrate the changes resulting from the use of Bio-Strath® Food Supplement. Only the first two assessments are compared in this paper.

The criteria for inclusion in the study took the form of a medical questionnaire which was drawn up by the doctor together with the parents of the test subject prior to the first assessment. The questionnaire was taken from the DSM-IV [C], mentioned above, and translated into German. On the basis of a simple scoring system, this allowed a

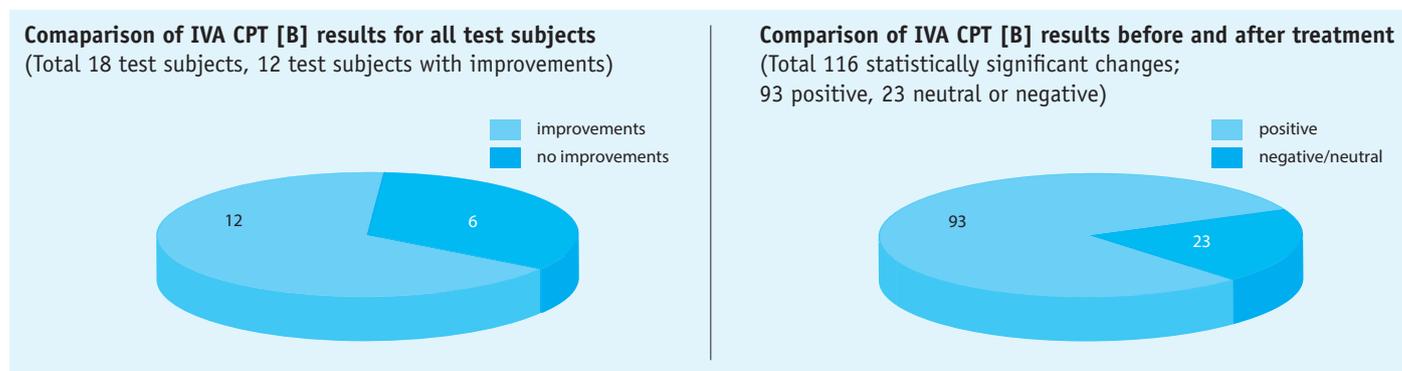


Figure 1: Changes between the first (without Bio-Strath® Food Supplement) and second (with Bio-Strath® Food Supplement) computer test in 18 test subjects

rough classification into ADHD, ADD or HD. If the medical questionnaire suggested an attention deficit disorder, further information about the patient was collected in the context of a questionnaire for parents and teachers respectively. These questionnaires were based on the papers by Conners, Baumann and others (7). The parents were subsequently informed about the application study and were able to decide whether their child should take part in the study or not. The parents gave their written consent in the form of a document approved by the Ethics Commission. (Approval for implementation of the study was given by the Ethics Commission of the Walliser Ärzteverband [General Medical Council of the Swiss canton of Valais]). The IVA CPT (Integrated Visual and Auditory Continuous Performance Test [B]) was then carried out and recorded on the computer. This test involves the test subject spending 13 minutes attentively recording verbal instructions for auditory performance, and numbers appearing on the screen for visual performance. Whenever a «1» occurs, either verbally or visually, the test subject must press the left mouse button as quickly as possible. If a «2» appears on the screen or if the test subject hears the number «2» through the headphones s/he must not press a mouse button. During the period of the test, the test subject is presented, in various blocks, with a series of spoken «ones» or number «1»s appearing on the screen, alternating with visual and auditory «2»s. The computer evaluation is based on the

correctness of responses and the time lapse between the stimulus and the (correct) response. On completion of the first IVA CPT [B], treatment was started immediately. Each test subject took one teaspoon of Bio-Strath® Food Supplement three times daily under the supervision of parents and teachers. The second computer test was carried out after about 6 weeks. The IVA CPT [B] software allows direct statistical comparison of the two test results. The 22 parameters analysed are related to one another in the form of scales and evaluated on the basis of specified statistical criteria. Of these 22 parameters, 7 are primary behaviour patterns: calmness, logical consistency, stamina, vigilance, concentration, speed and fine-motor activity. Changes can be read off clearly from the analysis. The test was set by the developers at California State Polytechnic University like an IQ test with a score quotient of 100 and a standard deviation of 15 and tested on a large number of subjects.

Results

Figure 1 shows a summary of the changes in the computer results. This evaluation takes into account those subjects tested between October 2001 and May 2002 at a paediatric practice and for whom the medical questionnaire suggested an attention deficit disorder (Table 1). It can be seen that in the case of 12 of the 18 test subjects statistically significant improvements were achieved with respect to one or more

parameters between the first and second assessments.

A distinction was made in the test scales between «response control» and «attention».

«Response control» was subdivided into auditory and visual sections. Each of these sections was assessed on the basis of «prudence», which is a measure of impulsiveness; «consistency», a measure for compliance with response times; and «stamina», which tests the differences in response times at the start and end of the test.

The «attention scale» was divided into «vigilance», «focus» and «speed». «Vigilance» measures inattention; «focus» reflects the variability of mental response times for achieving a correct result, while «speed» reflects the response times for all correct results and is a measure of (time) problems in mental processes.

When the change in the results after taking Bio-Strath® Food Supplement is assessed with reference to the main scales, the «attention quotient» is subject to a stronger positive influence than the «response control quotient».

When all the test subjects were analysed with reference to the subgroups of the «Response Control Quotient», the most marked progress with Bio-Strath® Food Supplement was seen in the following order: auditory parameters, visual parameters, motor regulation. In particular, control of auditory impulsiveness and visual compliance with response times were clearly improved.

In the «attention quotient» it can

Comparative computer results

Patient	Diagnosis	Rank	Score	Response Control Quotient									Attention Quotient									
				Full Scale	Auditory Subscale	Motor Regulation	Visual Subscale	Aud Prudence	Aud Consistency	Aud Stamina	Vis Prudence	Vis Consistency	Vis Stamina	Full Scale	Auditory Subscale	Visual Subscale	Aud Vigilance	Aud Focus	Aud Speed	Vis Vigilance	Vis Focus	Vis Speed
1	ADS	1	+15	39	42	41	29	40	14	31	17	19	24	35	37	28	56	20	-8	40	13	7
2	ADHD	2	+13	31	30	12	26	23	25	13	0	41	8	25	18	26	28	16	-14	14	23	20
3	ADS	3	+9	16	15	7	15	14	17	-1	6	16	6	21	17	21	9	14	5	12	24	8
4	ADS	4	+9	13	7	1	17	2	11	-1	-11	28	19	31	25	31	34	9	6	7	38	16
5	ADHD	5	+7	2	-4	-3	7	2	15	-25	-4	11	9	42	50	27	79	5	8	18	19	21
6	ADS	6	+7	24	26	-1	19	-2	6	47	7	30	-2	9	16	2	30	4	-7	2	0	3
7	ADS	7	+7	4	1	5	7	11	6	-15	11	13	-12	47	54	34	75	1	16	35	17	21
8	ADHD	8	+6	18	15	2	18	3	16	10	9	19	5	2	7	-2	5	18	-10	-20	17	-1
9	ADS	9	+6	7	9	1	4	17	-3	4	-7	41	-25	25	8	36	9	5	2	23	30	17
10	ADS	10	+2	13	16	1	8	9	3	19	2	10	5	7	0	13	0	-9	9	7	4	14
11	ADS	11	+2	5	12	-2	-3	2	5	20	-13	15	-9	9	4	13	-5	1	14	3	13	13
12	ADS	12	+1	-4	-7	-2	0	5	-3	-15	9	-1	-8	13	22	4	42	-5	0	6	1	1
13	ADS	13	0	-4	2	-8	-9	19	-9	-6	-8	0	-9	-2	-7	4	-19	6	-3	-8	8	8
14	ADS	14	-1	-8	-6	2	-9	-12	-6	7	-4	3	-16	6	6	5	9	-5	6	6	-6	12
15	ADHD	15	-1	-12	-8	11	-14	2	-5	-11	13	11	-55	-3	-7	2	-9	-6	0	-7	3	7
16	ADS	16	-2	7	5	-5	8	3	10	-3	-2	15	2	-7	-27	9	-33	9	-21	12	7	0
17	HD	17	-3	-1	-3	-7	0	0	-22	16	-2	-13	15	-21	-17	-22	-14	-14	-1	-10	-29	-7
18	ADS	18	-7	-12	-5	-31	-16	5	2	-17	-13	-9	-12	-13	-26	0	-40	3	-10	-7	0	7

Table 1: Summarising comparison table of the first two assessments. The figures represent the changes in IVA CPT [B] results between the two assessments. Positive figures indicate improvement, negative figures deterioration. Figures in bold type represent statistically significant differences.

be seen that vigilance with auditory stimuli and processing of visual stimuli showed the most marked positive change under the influence of Bio-Strath® Food Supplement.

Finally, two test subjects, who derived clear benefits from taking Bio-Strath® Food Supplement, are presented in detail.

V.M., a boy aged 10 years, presented in the ADHD criteria with a clear inclination to inattentiveness and a slightly less marked tendency to hyperactivity. His parents described him in the questionnaire as very excitable and impulsive. Other problems were «deciding for himself», sucking or chewing his nails, clothing and blankets, together with being easily distracted and inattentive. The main problems as far as his teacher was concerned were fidgety restlessness, inappropriate noises, fits of rage, inattentiveness and impulsive excitability. The IVA CPT [B] test before taking Bio-Strath® Food Supplement revealed marked hyperactivity. In the auditory sections of the test he had achieved 91 correct of 125 responses with an average time of 750 milliseconds. In the visual sections, 83 of 125 responses were correct with an average time of 530 milliseconds. After taking Bio-

Strath® Food Supplement for two months, no hyperactivity was recorded during the test. In the auditory section, 115 of 125 responses were correct with a slightly higher average time of 810 milliseconds. In the auditory section, he had achieved an increase to as many as 122 of 125 correct responses and a reduction in the average time to 497 milliseconds. In the direct computer comparison of 19 scales, V.M. had achieved statistically significant improvements in 15 scales. In the verbal concluding report, his parents reported that the boy had better concentration, was more independent in doing his homework and suffered less from tiredness. In particular, they stressed that his ability to play as part of a team at the football club had become considerably better. V.M. is continuing to take Bio-Strath® Food Supplement.

The medical questionnaire for the seven-year-old B.J. showed very marked lack of attention, hyperactivity and impulsiveness. This is the clearest finding among all 18 test subjects. The parents also described their son as noticeably impulsive with a marked tendency towards deciding things for himself, as fidgety, sulky and with a tendency to moan.

The boy was very much concerned with loneliness, illness and death and his feelings were easily hurt. He was easily distracted, did not obey rules and quickly became frustrated. The teacher saw his excitability and impulsiveness as the greatest problems. B.J. completed the initial computer test with 94 correct auditory tasks out of 125 and an average response time of 738 milliseconds. In the visual tasks, he achieved 96 of 125 with an average response time of 636 milliseconds. Mild hyperactivity was observed during the test. In the second test, after taking Bio-Strath®, he achieved 103 of 125 correct responses with a slightly longer average response time of 828 milliseconds. In the visual section, he achieved 117 of 125 correct responses and his reaction time improved to 521 milliseconds. No hyperactivity was recorded. The comparative analysis of the first and second IVA CPT [B] tests shows a statistically significant improvement in 12 of the 19 parameters. His parents saw progress in particular in terms of his greatly improved concentration, reduced tiredness and greater interest, in homework as well as other things, and lower susceptibility to illness.

Discussion

This application study with Bio-Strath® Food Supplement was based on the results of earlier tests and surveys of healthy and behaviourally disturbed schoolchildren and adults who had taken the product (1–6). Since the majority of these children reacted positively to taking the Food Supplement and benefited, in particular, in the fields of attentiveness and concentration, it was reasonable to organise a study for the problem group of children with severe attention deficit disorders.

As can be seen from Table 1, a total of two-thirds of all test subjects benefited from taking Bio-Strath®. In other words, the majority of the children achieved a better result in the second computer test. The sum of the positive changes here is overproportionally greater than the sum of the neutral or negative changes. Of the six classes in the auditory and visual fields, progress was seen par-

ticularly in terms of auditory «prudence», the measure for impulsiveness, and in auditory «vigilance», the measure for attentiveness, as well as in visual «consistency», the measure for compliance with response times, and visual «focus», the measure for variability of the response times. Little or no improvement was recorded in the visual «stamina» parameter, the measure of differences in response time between the start and end of the test. These results are objective computer evaluations and therefore leave no room for subjective interpretations. At present it is difficult to find reasons for those cases that did not improve while taking Bio-Strath®. The degree of attention deficit disorder within this group is almost impossible to assign to a single subgroup, either clinically or on the basis of our written records. No indication was seen of any special characteristics among the subjects of this group in comparison with children who exhibited an improvement.

Further investigations using a larger study group might provide answers. Thus, the question of who might benefit from taking Bio-Strath® Food Supplement in cases of attention deficit is not an easy one to answer. However, what must be considered is the fact that not a single adverse reaction was reported throughout the entirety of this study. This means it is possible to introduce the use of Bio-Strath® Food Supplement at any time without difficulty for children with attention and concentration problems or for children suffering from ADD/ADHD.

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[A] Bio-Strath® Food Supplement consists of plasmolysed herbal yeast. (Bio-Strath® is sold in many countries as Strath® Food Supplement)

[B] IVA CPT = Integrated visual and Auditory Continuous performance test by Joseph A. Sandford, Ph.D. & Ann Turner, M.D., Richmond, USA

[C] DSM-IV = Diagnostic and Statistical Manual of Mental Disorders of the American Psychiatric Association.

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The influence of a food supplement on the behaviour and health of schoolchildren in a school for children with special needs

Influenza prophylaxis was carried out in a school for children with special needs using a food supplement made from plasmolysed herbal yeast (Strath® Food Supplement). Three health-related and eight behaviour-related parameters were recorded on an individual basis using weekly questionnaires. The results of the medically supervised prophylaxis are reported below. One of the points noted is a marked change in the behaviour of the children.

Introduction

A study was carried out in Switzerland over a period of 20 weeks from 21 October 2002 to 28 March 2003 at a school for children with special needs, using a food supplement made from plasmolysed herbal yeast (Strath® Food Supplement). Since the pupils suffered repeatedly from colds during the winter months, those in charge of the school were looking for a preventive measure to improve immunological defence and therefore agreed to take part in the present study. Scientific investigations with Strath® Food Supplement (Bio-Strath AG)ⁱ have shown that the plasmolysed herbal yeast affects lymphocytes, which are important for immune defence, but also has a favourable influence on school performances (cf. Defares, Kema & van der Werff, 1972; Dörling, 1981; Joller, Schwarzenberg & Cogoli, 2000; Joller, 1996; among others). For this reason, the study focused on the learning behaviour of the children and young people in addition to recording data relating to their health.

Study design and methods

The application study commenced with 83 schoolchildren aged from 4 to 18 years of both genders but wi-

thout a control group, since all the children were intended to benefit from the prophylaxis. Written consent had been obtained from the parents after they had been provided with detailed information. Nine female pupils and ten male pupils did not complete the study and were not included in the analysis. During the study, the food supplement was taken by the pupils based on a dose of 1 teaspoon twice a day under the supervision of teaching staff at school (or of parents in out-of-school time). The class teacher completed a questionnaire with 11 questions each week for each child (score: 1: poor – 4: good). Eight of the eleven questions referred to parameters linked to the specific problems experienced by these children. Three questions referred to physical health.

The scores from the questionnaires, separated according to the problems investigated, were summarised for each child and then analysed both individually and for the group as a whole. Figure 1 shows an example (p. 27). For instance, a positive trend can be seen for the concentration parameter in one male pupil over the 20 weeks (mathematically calculated trendline). Thus, this boy's powers of concentration appear to have improved over time under the influence of the preparation.

Results

There is no statistical indication of a perceptible influence of age or gender of the pupils on the results of the study. They are therefore treated in terms of a group as a whole.

Health parameters

The days of illness of the individual schoolchildren were shown in the school's weekly reports. These absences refer to all types of illness, not exclusively flu-like illness. 106 days of illness were logged for the schoolchildren from the total of 5640 school days recorded. Figure 2 (p. 27) shows the flu-type symptoms (common cold, cough, fever) during the period of the study in comparison with the Sentinellaⁱⁱ data from the Swiss Federal Office for Public Health (BAG). During the period of the study, a severe common cold was recorded in fewer than 5% of the questionnaires. Mild to moderate colds were reported in some 24% of the individual questionnaires. Coughs are mentioned in a little over 12% of all the questionnaires with a severe cough being reported in only 1.5% of all evaluations. Fever was noted in 3.3% of all reports and high fever in 0.6% of them.

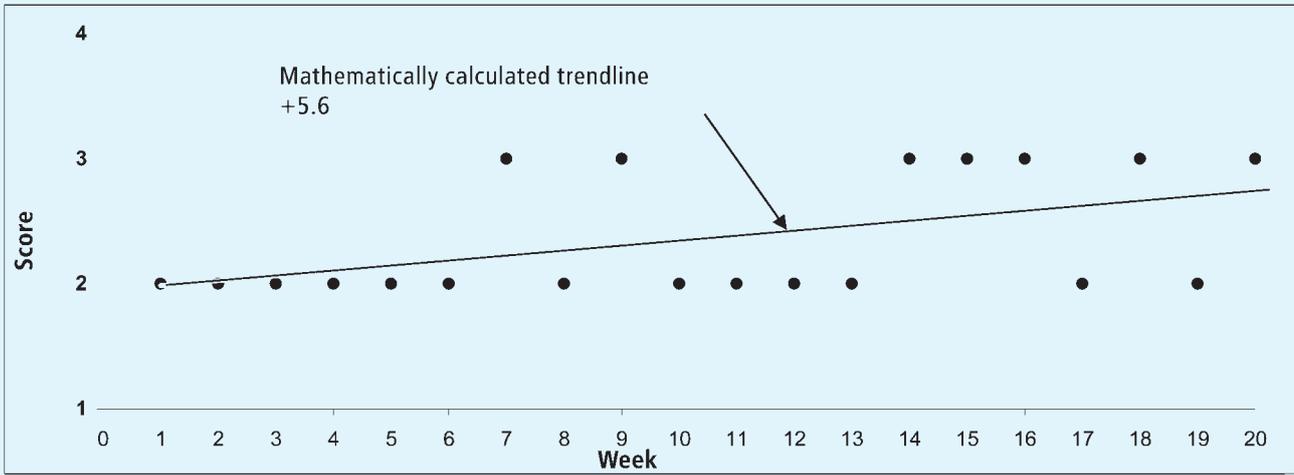


Fig. 1: Example of an individual analysis of the concentration parameter (value/score per week) with a calculated trendline.

Behavioural parameters

Concentration

The ability to concentrate during lessons is one of the main problems of the schoolchildren (lowest overall mean). The evaluation over the 20 weeks of the study shows a positive trend of +0.72, the highest individual trend slope observed being +10.0. In 36 of 64 of the participants (56%) the score improved or remained stable during the period of the study (cf. Table 1, p. 28).

Distraction

Allowing oneself to be distracted and lack of concentration are similar processes – therefore, the mean scores in our study are close together (concentration: 2.2; distraction: 2.7).

The mean trend however is substantially higher for the distraction parameter at +1.21 and is thus at the top of the list of improvements within the group as a whole. 43 of 64 pupils (67%) improved in this parameter (the most impressive improvement is seen in one female pupil with +8.31) or at least remained stable (cf. Table 1, p. 28).

Restlessness

Restlessness is not compatible with concentration and attentiveness – on average, the teaching staff report a fairly high level of restlessness among their pupils (mean value: 3.2). Restlessness tended to decrease somewhat during the period of the study (trend: +0.90). 67% of the

schoolchildren made progress over the 20 weeks or remained constant (cf. Table 1, p. 28).

Agitation

Other modes of behaviour that adversely affect learning are mental and physical agitation (mean value: 3.3; slope +0.85). Here, again, stability or improvement was seen in 72% of the schoolchildren over time (cf. Table 1, p. 28).

Disturbing lessons

What changes occur in disturbance during lessons? This was another parameter that the teaching staff had to assess, and here, too, there was a change in behaviour during the study (mean value: 3.3; trend: +0.57).

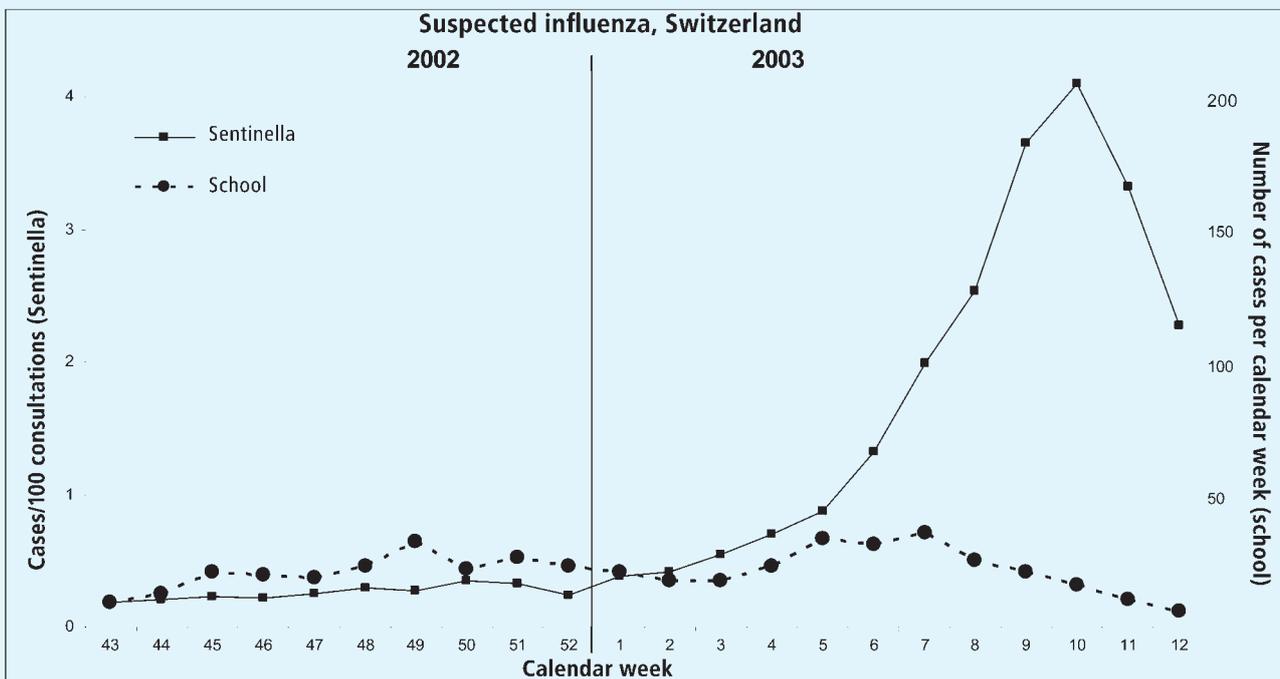


Fig. 2: Flu situation in Switzerland (Sentinella) in comparison with the number of schoolchildren with common colds, coughs or fever in the school being studied.

The figures for 47 of the 64 pupils remained stable or improved (73%) (cf. Table 1, p. 28).

Disturbing other pupils

The teaching staff assessed their pupils on the parameter of disturbing their schoolmates as well as the parameter relating to disturbing lessons. The mean score is also 3.3 (cf. Disturbing lessons). The group as a whole exhibits a positive trend slope of +0.14. More than two-thirds of the schoolchildren remained stable or showed positive development in this parameter (cf. Table 1, p. 28).

Fatigue

With a score of 3.5, the mean is already close to the maximum achievable score of 4.0. Fatigue is therefore not one of the main aspects as far as the specific problems are concerned. The trend curve increases during the period of the study with a slope of +0.42 (cf. Table 1, p. 28).

Aggression

Aggression is not a major problem in the school either (mean score: 3.6). Here, again, no deterioration in the situation was seen over the course of the study but, as with the other parameters, there was an ascending trendline (cf. Table 1, p. 28).

Discussion

Health parameters

The study period lasted from the warm late autumn of 2002 through the cold and relatively snowy winter into the frosty early spring of 2003. The influenza situation in Switzerland (cf. Fig. 2, p. 27) shows a clear-cut peak in medical consultations for flu-like illnesses at the end of February 2003. In contrast to the expectations based on this fact, we find no increased frequency of flu symptoms among the schoolchildren we were studying during the widespread influenza activity in Switzerland and Europe. It would therefore appear that the prophylaxis did have a certain effect. Although it is not possible to make a comparison with a similar group without preventive measures, it can be stated that symptoms arising from common colds tended to be infrequent and to occur in mild form during the period of the study. A list of absences in the corresponding months of the previous school year was available for 34 of the 64 participants in the study. A comparison of the months from January to March shows that the absences of these children decreased by 42% during the prophylactic treatment with Strath® Food Supplement. The teaching staff and those

The Head teacher writes:

«In our school for children with special needs, with an average roll of 80 children, we wanted to deal with the large number of school days lost by the children as a result of common colds, coughs and flu during the winter months. Our aim was to reduce the number of days of sickness. We had tried various things.

As a result of visiting the Bio-Strath® factory in Herrliberg/Zurich, we decided to take part in a study. The result was convincing; fewer days of sickness were recorded and, as a side effect, improvements were also seen in various effects, primarily in the field of concentration and behaviour.

This experience led us to continue giving Strath during the winter months, working in cooperation with the parents.»

(Editor's note: Those in charge of the school do not wish to be mentioned by name. Further information regarding the study, its organisation and progress may be obtained from the author.)

Parameter	Score mean	Standard deviation +/-	Mean trend slope (group)	Maximum trend slope (individual)	Improvement or stability in n/N
Concentration	2.2	0.7	+0.72	+10.00	36/64
Distraction	2.7	0.8	+1.21	+8.31	43/64
Restlessness	3.2	0.8	+0.90	+10.00	43/64
Agitation	3.3	0.8	+0.85	+9.47	46/64
Disturbing lessons	3.3	0.8	+0.57	+8.44	47/64
Disturbing other pupils	3.3	0.7	+0.14	+8.44	43/64
Fatigue	3.5	0.5	+0.42	+9.50	43/64
Aggression	3.6	0.5	+0.24	+9.00	44/64

Table 1: Summary of the results: scores and trends for the parameters recorded.

in charge of the school are also of the opinion that the signs of illness were few in number and of a low level of severity compared to previous years (cf. Box, p. 28). Thus, in our opinion, the primary objective of prophylaxis of colds and flu-like diseases was achieved.

Behavioural parameters

Behavioural and learning problems are to be expected in a school for children with special needs. It is therefore of great interest to analyse the progress made over the 20-week period in more detail.

In this context, it cannot automatically be assumed that behaviour contributing to learning success remains stable over the winter term, which is in many respects a demanding one. This makes the result of

improvement (or stability) in all the modes of behaviour recorded even more pleasing. The two parameters «distraction» (trend: +1.21) and «concentration» (trend: +0.72) show the greatest progress in our study. Overall, the results suggest that the whole group of schoolchildren benefited from daily administration of the food supplement.

Of course major differences can be seen in individual responses to the food supplement, some of which are impressive. An analysis of the children exhibiting the greatest improvements with respect to the individual parameters shows that over a quarter of them made very good progress in more than two modes of behaviour.

Overall, the objective of the study was achieved: to provide a prophylactic health treatment during

the winter months using a food supplement made from plasmolysed herbal yeast and to record an overall improvement in learning behaviour. The prophylaxis using Strath® Food Supplement was used again at the school for children with special needs in the following winters.

Notes:

- i Strath® Food Supplement consists of plasmolysed herbal yeast (Strath® is sold in many countries as Bio-Strath®). Manufacturer: Bio-Strath AG, Mühlebachstrasse 38, CH-8032 Zurich (Switzerland).
- ii The Sentinella Reporting System of the Swiss Federal Office for Public Health is used to obtain epidemiological data, to monitor transferable and other acute diseases and for research into general practice medicine. Measles, mumps, rubella and suspected influenza have been recorded continuously since 1986.

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Increased concentration – improved performance at school

Background

The decline in the performance of our schoolchildren is giving cause for concern, particularly in many urban schools. This decline does not necessarily mean that children are less gifted than they used to be; there is no doubt that it arises largely from our changed environmental conditions, especially the ever-increasing flood of stimuli to which we are exposed today. Against this familiar background, I should like just to reiterate the results of a study carried out by the Hamburg University Hospital on 2000 six-year-olds. More than half (55%) of these children, who were just starting school, suffered from nervous disorders, every fifth child had a poor appetite and a further one in five suffered from disturbed sleep, pathological habits and motor unrest.

The product

Bio-Strath® is a natural food supplement made from yeast and herbs and rich in important substances, which acts to combat fatigue (school fatigue, seasonal lethargy, restlessness) and poor concentration, and to increase physical and mental capacities.

The valuable Elixir contains yeast cells, which are grown on selected herbs using a special process and plasmolysed (liquefied) without heating. In other words, it is free from any artificially manufactured substances. Numerous studies conducted in institutes and universities have confirmed the wide range of action of Bio-Strath®.

School trial in Berne

The aim of the study was to ascertain whether previous favourable results obtained in combatting school fatigue could be confirmed and new data collected. All 24 girls in the

eighth class of a secondary school in Berne, who participated voluntarily in the trial with the consent of their parents, were given one teaspoonful of the Elixir at school three times daily before their main meals. The study was carried out for ten weeks from 9 January to 21 March.

Results in school marks

	Average (best mark=6)	Change in marks
Intercantonal test		
Winter, before Bio-Strath® trial	4,3	
Spring, after Bio-Strath® trial	5,7	+1,4
Test of combined ability, language		
Winter	4,5	
Spring	5,8	+1,3
Test of combined ability, arithmetic		
Winter	4,6	
Spring	5,6	+1,0
School report marks		
Arithmetic autumn	4,52	
Winter, before Bio-Strath® trial	4,66	+0,14
Spring, after Bio-Strath® trial	4,92	+0,26
All six main and secondary subjects		
Autumn	26,7	
Spring	28,2	+1,5
Total of all school report marks		
Autumn	62,2	
Spring	64,0	+1,8

Absences

Comparison between different classes	Absences in lesson periods				Number of pupils	Absences in lesson periods over ten weeks Average per pupil
	Jan	Feb	Mar	Total		
All girls class						
Bio-Strath® trial class	8	8	2	43	24	1,9
Control class, 1 year older	224	74	55	353	21	17,1
Control class, 1 year younger	41	40	0	81	21	3,8
Co-ed classes, same age						
1st parallel class	102	38	54	194	26	7,5
2nd parallel class	135	22	0	157	26	6,1

Tests and comparisons were made particularly in arithmetic, using both the normal arithmetical material covered and a few additional arithmetic tests. These tests were taken from the examination series compiled by the „Intercantonal Secondary School Conference“ in order to avoid any suspicion of bias by the teacher involved, since the tests are linked to calibrated performance assessment standards which preclude any subjective marking.

Analysis of the test series is particularly illuminating. These series contain material from the sixth year curriculum, which was neither practised nor drilled at any time during the trial period. The **markedly better results**, the average performance improvement of 1 to 1,4 marks per pupil, are therefore entirely due to **improved concentration** and **endurance** and hence to **improved memory performance** in the girls, since the tests used for comparison with one another were deliberately set to be solved only at the same times of day and generally also on the same days of the week.

The other marks also show a clear improvement in performance. Compare the arithmetic marks, for example. As far as the last two comparisons are concerned, it must be borne in mind that they extend over the whole semester (the three months of the study covered the se-

cond half of the semester). Thus, taken by themselves, they would provide no definitive information. On the other hand, their significance is enhanced by the fact that the performance improvements which they reveal were assessed almost exclusively by teachers who had not participated in the study for reasons of time and other factors. It should, of course, also be taken into account that, during the eighth school year, puberty will distort some of the results. However, even taking into account all the necessary reservations with respect to the individual comparisons, there remains an unmistakable and marked improvement in performance.

Increase in the body's resistance to infection

Of the many known effects of the preparation, the **increase in the body's resistance to infection** was shown most clearly in addition to the actual objective of the trial. Despite the many cases of flu occurring in the area, the average absence per pupil in the trial class was less than two lesson periods, or, more accurately: no girl missed more than two days during the period of the comparison. The longest absence was only sixteen lesson periods. Compare this with the absences in other classes at the same school (cf. Table).

Summary of the results

Once again, it has been possible to furnish proof that Bio-Strath® helps to improve performance in cases of school fatigue, weakness in school and poor concentration. The effect is achieved, among other things, by increasing concentration and endurance and by reducing restlessness and weakness of memory. There is a considerable concurrent increase in the body's resistance to infection and an improvement in general well-being. This is indicated by the subsidiary results and demonstrated by medical trials and investigations in this context, these improvements having a positive effect on performance.

Bio-Strath® and increased performance

Summary of a double-blind trial of Bio-Strath® Elixir on 60 test subjects by Prof. Dr. E. Dörling, Hamburg

Cardiovascular diseases continue to be at the top of the list of medical risks. The causes are well known. They include high blood pressure, excessively high blood fat levels, etc., being overweight, lack of exercise, excessive stress and a poor diet, as well as the abuse of stimulants, particularly alcohol and tobacco. Regular physical exercise is recommended as an important countermeasure for men and women in today's civilised world, whose lives are mostly sedentary. It is useful to reinforce this type of physical exercise with preparations which improve performance. The double-blind study described below demonstrated that Bio-Strath® Elixir is ideally suited for this purpose.

Sixty subjects, aged between 24 and 80, volunteered for the double-blind study, which was carried out over a period of 12 weeks.

Half of these volunteers were men and half women, half smokers and half non-smokers. They were divided into two identical groups, one of which was given Bio-Strath® and the other a placebo (tea slightly sweetened with artificial sweetener).

No changes in lifestyle

None of the volunteers was undergoing medical treatment, they all felt healthy and were instructed not to change their lifestyle during the twelve-week study period and not to take other tonics, vitamin tablets, etc. They were also asked to give details of their eating habits and to report any colds, any indispositions of whatever type and any side effects they might perceive.

Assessment of the results

At the start of the trial and every fourteen days thereafter the test subjects were interviewed regarding their condition on the basis of a questionnaire, the following parameters being taken into account:

Test criteria

1. Fatigue
2. Nervousness
3. Concentration
4. Resistance
5. Physical capacity
6. Mental capacity
7. Vitality

Both the interviewer and the subject himself had to assess, by awarding marks, whether there had been a deterioration, no change or an improvement for each parameter. The data collected in this way was supplemented at the end of the trial, i.e. after twelve weeks, by an additional, general self-assessment.

Supplementary experimental measurements

In addition, the following technical measurements were recorded from experiments undertaken:

Assessment of the optical fusion threshold (1)

The frequency was determined at which periodically recurring light stimuli were perceived as brightness of continuous and equal intensity. The test was performed for all the test subjects at the start and end of the trial.

Assessment of reaction time (2)

In this assessment, the time interval was determined between the appearance of a stimulus and the onset of the agreed response (e.g. between the flashing of a lamp and depres-

sing a key). The test was carried out at the start of the study and after 4, 8 and 12 weeks.

Assessment of bimanual coordination (3)

All the test subjects were asked to touch marked fields on two metallic discs simultaneously with contact pens held in the right and left hands. The number of correct contacts within a 30-second period was recorded. This test was carried out at the start of the double-blind study and after 4, 8 and 12 weeks.

Determination of recovery quotient (4)

The recovery quotient is calculated from the ratio of increased oxygen consumption during effort to increased oxygen consumption during recovery. It was recorded for all test subjects at the start and end of the trial.

Assessment of physical performance on a bicycle ergometer (5)

The performance of the subjects at a test speed of 15 km/h for 5 minutes was determined after 4, 8 and 12 weeks.

Results of objective, technical measurements. Improvements at the end of the study, after 12 weeks:

	Placebo group	Bio-Strath® group
1. Optical fusion threshold	+30%	+53%
2. Reaction time	+20%	+37%
3. Bimanual coordination	+17%	+54%
4. Recovery quotient	+17%	+60%
5. Bicycle ergometer	+19%	+66%

Blood pressure assessment

Systolic and diastolic blood pressure at the start of the study and after 4, 8 and 12 weeks.

A marked success for Bio-Strath®

Even the results of the interviews alone suggest the positive action of the Elixir. A comparison of the *self-assessments* (parameters 1 to 7) by the test subjects in the Bio-Strath® group prior to the start of the study and after 12 weeks clearly illustrates this. The data is rein-

forced by the results of the interviews after 2, 4, 6, 8, 10 and 12 weeks and by the results of the objective *technical measurements* (1 to 5) (cf. figures).

Of 1260 possible statements (fatigue, nervousness, concentration, resistance, physical and mental capacity, vitality), a **10% improvement** was reported by the **placebo group** and a **64% improvement** by the **Bio-Strath® group**.

No alterations in blood pressure were observed in either the placebo or the Bio-Strath® group. Specific

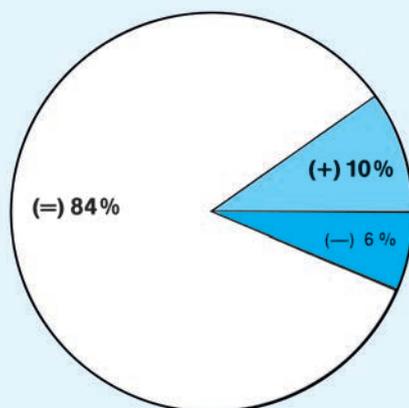
observations made in the Bio-Strath® group were as follows: greater energy and enterprise, less tiredness, improved sleep, improved digestion, fewer headaches, less brittle nails, fresher skin.

Knowledge acquired from the double-blind study

The results obtained justify the statement that Bio-Strath® Elixir can help to improve concentration, vitality and performance levels.

A comparison of all statements in the placebo group and the Bio-Strath® group

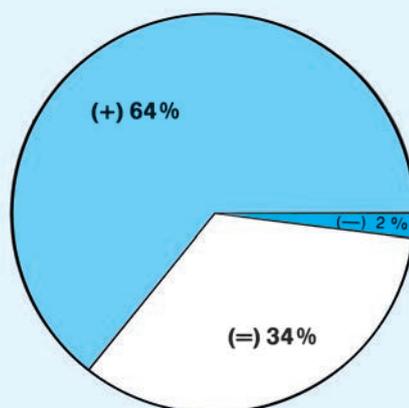
Results of the interviews after 2, 4, 6, 8, 10, 12 weeks



Placebo group

Total number of statements 1260

Deterioration (-) 6% = 74
 No change (=) 84% = 1065
 Improvement (+) 10% = 121



Bio-Strath® group

Total number of statements 1260

Deterioration (-) 2% = 20
 No change (=) 34% = 427
 Improvement (+) 64% = 813

Pre-geriatric Study

Results of a randomised double-blind study with Bio-Strath® involving 184 prematurely aged patients

The increase in multiple illness due in no small part to improved living standards and higher life expectancy goes hand in hand with a substantial increase in the number of premature geriatric disorders. A randomised multi-centre double-blind study carried out with 184 patients in 1988/89 helped to identify some of the possible causes.

We also wished to know whether this development was an inevitable consequence of the prolongation of life or rather the result of a lifestyle which has virtually no regard for physical and mental health. We knew from the results of previous investigations involving prematurely aged patients that social environment also seems to have an effect on the development of geriatric disorders.

Research carried out between 1972 and 1989 has revealed that Bio-Strath®, a special plasmolysed herbal yeast preparation (liquid or tablets) not only has a regenerative effect on the body as a whole, but can also be used for prevention and treatment of specific illnesses triggered by bacterial infection or exposure to radiation.

To identify the therapeutic potential of the yeast preparation for so-called «(pre-)geriatric diagnosis», we carried out a controlled study in two hospitals and four general practices.

In the study, the patients were allocated on a random basis and in roughly equal numbers to the following treatment groups: «Bio-Strath® tablets», «Bio-Strath® liquid» and «placebo syrup».

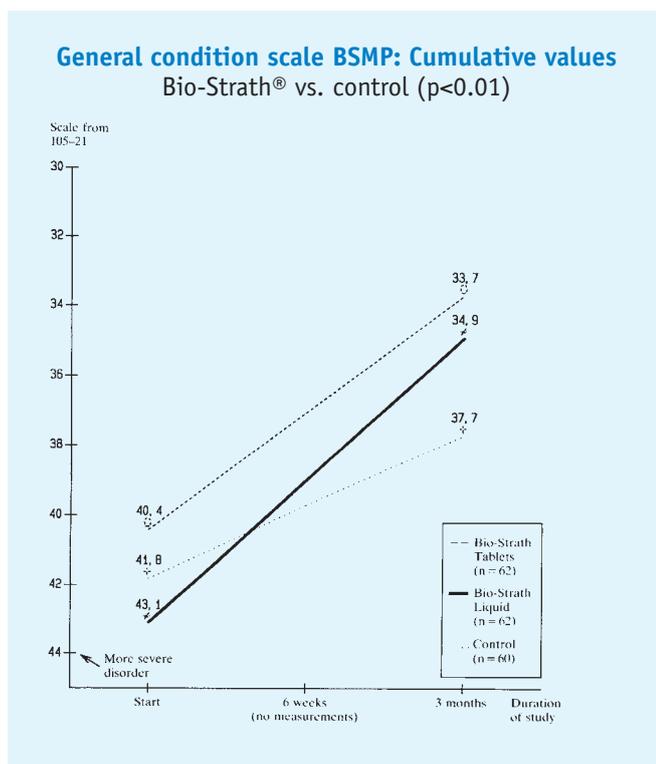


Fig. 1: Mean value progression using the «BSMP general condition scale», sum of physical, mental and emotional restrictions: improvement significantly positive for all groups (p<0.001). Difference between control and Bio-Strath® very significant in favour of Bio-Strath® (p<0.01).

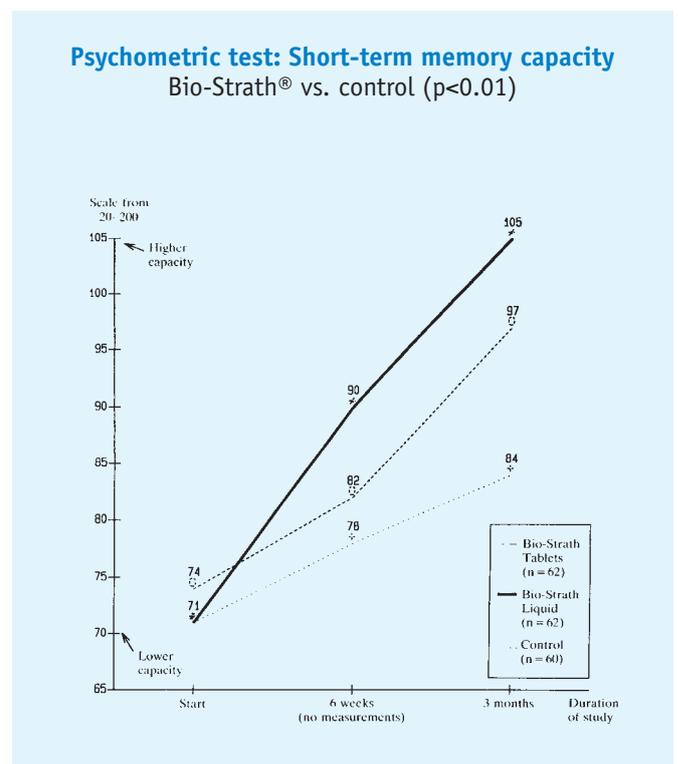


Fig. 2: Mean value progression for the «short-term memory capacity», parameter (psychometric test): progress significantly positive for all groups (p<0.01). Difference between control and Bio-Strath® liquid highly significant (p<0.001), difference between control and Bio-Strath® tablets very significant (p<0.01) in favour of Bio-Strath®.

During the 3-month study, the major parameters of multiple geriatric disorders were measured in the patients, whose ages ranged from 45 to 83. The individual indicators of efficacy were as follows:

- Cardio-vascular (ergometric) test
- Sensomotor function (psychometric) test
- Geriatric diagnosis scale (premature multiple disorders)
- 21-point general condition scale (e.g. disordered balance, memory-speech impairment, depression)
- Overall medical assessment

The results for all five indicators support our hypothesis that the development of geriatric disorders can be retarded or even reversed with Bio-Strath® therapy.

Fig. 1 shows the effect on the general condition scale BSMP; the medical evidence gathered relating to somatic, mental and emotional condition indicated a general improvement in the course of the study. This, however, was more evident in both the Bio-Strath® groups than in the placebo group, to a highly significant extent ($p < 0.01$).

An improvement was also apparent in all groups in terms of the results of the psychometric test (Fig. 2).

However, the increase in the short-term memory capacity of the patients in the Bio-Strath® groups was again significant compared with the placebo group ($p < 0.01$).

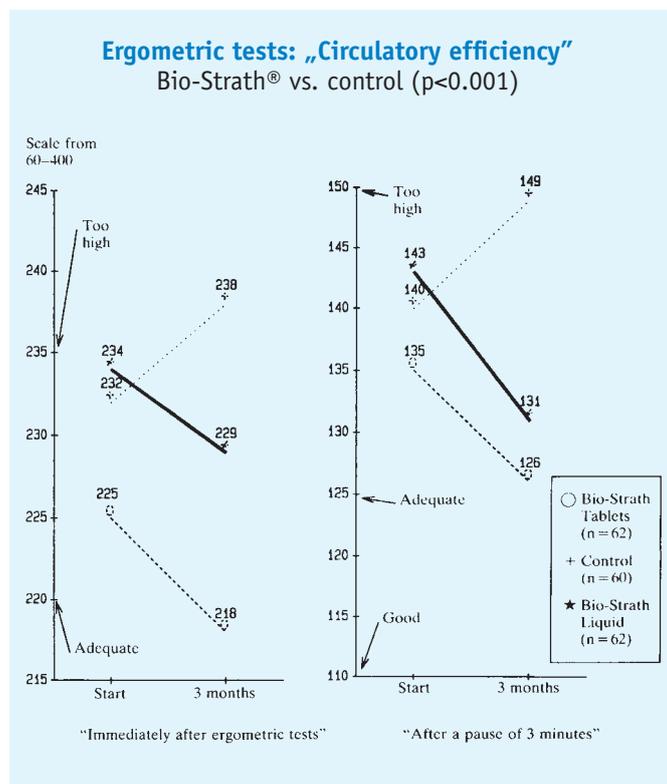


Fig. 3: Progression for the «circulatory efficiency» parameter = «systolic blood pressure x pulse/100» (ergometric test): progress «after a pause of 3 minutes» significant in the Bio-Strath® groups ($p < 0.05$). Difference between control and Bio-Strath® highly significant ($p < 0.001$) in favour of Bio-Strath®.

The ergometric test, on the other hand, revealed deterioration in circulatory performance only in the placebo group (Fig. 3).

At the end of the three-month treatment period the physical exercise tests using the ergometer produced clearly more favourable blood pressure x pulse readings for both the Bio-Strath® groups compared with the start of the study and with those produced by the placebo group. Furthermore, the shorter recovery time of the Bio-Strath® groups (measured 3 minutes after the test) was highly significant ($p < 0.001$).

The results in terms of age-related physical symptoms were also significantly more favourable in the Bio-Strath® groups (Geriatric Diagnosis Scale).

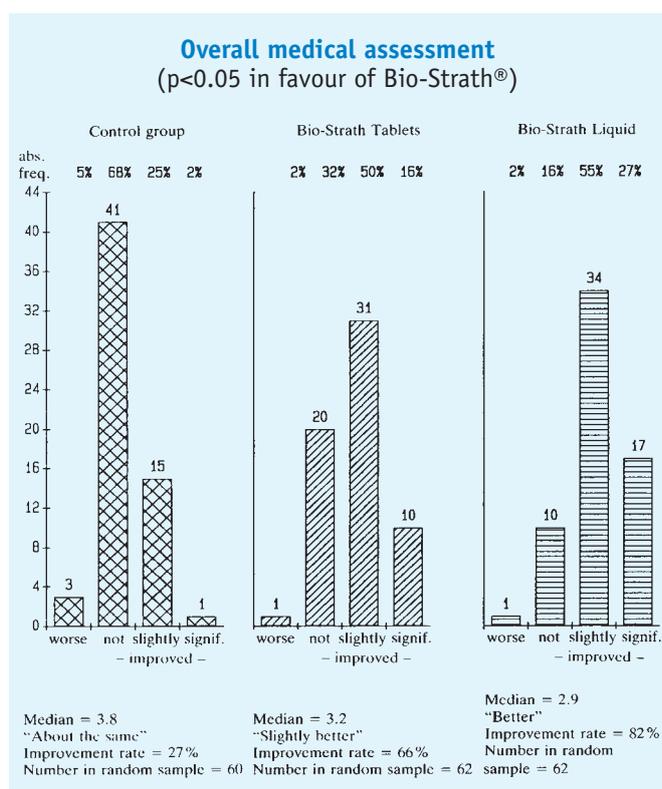


Fig. 4: Assessment of the treatment (overall assessment) by the physician after the three months of the study: differences between control and Bio-Strath® highly significant ($p < 0.001$) in favour of Bio-Strath® liquid, significant in favour of Bio-Strath® tablets ($p < 0.05$).

Last but not least, the «overall medical assessment» of the results of the treatment showed clearly in favour of the Bio-Strath® groups ($p < 0.05$). While the improvement rate for the placebo group was evaluated at only 27%, the tablet group scored 66% and the Bio-Strath® liquid group as much as 82% (see Fig. 4).

The major improvements identified not only relate to comparison of the results of the study with the initial situation, but also to comparison with the placebo group. The extent of these improvement was directly proportional to the age of the patients and the severity of their illnesses at the start of treatment.

Pre-Alzheimer Study

Results of a randomised double-blind trial with Bio-Strath® on 75 pre-Alzheimer patients

Although there are signs that a breakthrough might be achieved over the next few years in the diagnosis and maybe even in the treatment of Alzheimer's disease (visible failure in occupational demands, reduced capabilities with respect to shopping, dressing, memory, dealing with finances, etc.), current success rates, as regards diagnosis and certainly as regards treatment, are unsatisfactory.

However, the rapid increase in the number of patients with SDAT (Senile Dementia Alzheimer Type) means that it is increasingly important that the problem be dealt with and even minor successes realised. Some 10% of over-sixty-fives (and the trend is increasing) suffer from manifest cerebro-organic syndromes of moderate to severe degree, half of these syndromes being classified as SDAT.

As long ago as 1988/89, the author conducted a multicentre, controlled trial, in collaboration with several doctors, on 184 pre-geriatric patients aged between 45 and 75 years, in which Bio-Strath® (plasmolysed herbal yeast food supplement) was given for a three-month period. The trial proved the efficacy of the preparation in inhibiting geriatric developments while simultaneously increasing performance and efficiency.

Another double-blind trial in 1990/92 involved 75 geriatric patients aged between 55 and 85 years, with suspected mild forms of dementia. The aim was to clarify whether Bio-Strath® given over three months exerts a detectable, beneficial influence on the symptoms, at least. 530 test points were recorded for each patient under the following criteria:

- medical assessment on a nine-point scale
- clinical status
- short-time memory capacity determined from psychometric findings
- somatic geriatric findings in the following areas: respiratory tract, cardiovascular system, joints and spine, other geriatric diseases.

Results

The doctor's overall assessment confirms the improvement in symptoms in the active treatment group (Table 1). The effect of the treatment is even more

clearly seen in the summed values for the GESY scale made up from 36 individual scales (neurological/psychiatric geriatric symptoms).

Table 1: Trial results: Doctor's assessment (Classes 1-9), frequency in per cent

Condition	Placebo	Active treatment
2 Major improvement	0%	7%
3 Marked improvement	7%	27%
4 Slight improvement	17%	25%
5 No change	45%	41%
6 Slight deterioration	28%	0%
7 Marked deterioration	3%	0%

The placebo results deteriorated over the three-month treatment period. The positive neurological geriatric development in the active treatment group can be assessed even more unequivocally by contrast. An initial mean of 90 (moderate degree of disorder) fell to less than 77 (fairly mild) by the end of the treatment. The difference in favour of the active treatment is highly significant ($p < 0.001$) (Fig. 1).

The differences over time in favour of the active treatment are very significant in all four sub-areas of the GESY scale: somatic, mental, intrapsychic and psychosocial disorders. This was also the case for the individual criteria (Table 2).

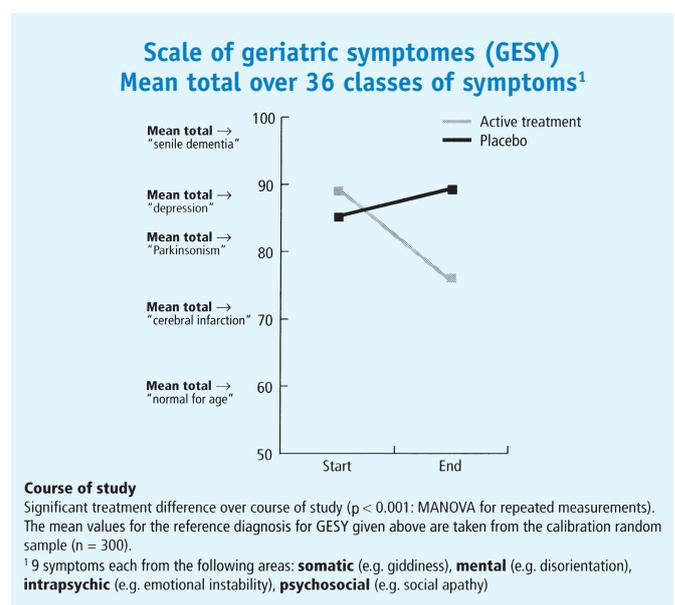


Fig. 1: Scale of geriatric symptoms: Summed value.

Tab. 2: Difference over time between placebo and active treatment for selected GESY individual scales (medians)

Assessment: 1 = n.a.d., 2 = very mild, 3 = mild, 4 = moderate, 5 = moderately severe, 6 = severe, 7 = very severe disorder. Sub-scales: S = somatic, M = mental, I = intrapsychic, P = psychosocial disorders

Scale	Placebo		Active treatment		Difference over time in favour of active treatment	Significance in favour of active treatment
	Start	End	Start	End		
S1 Fatigue	4.0	3.9	4.1	3.3	0.7	0.05
S2 Headache	3.8	3.7	4.4	3.3	1.0	0.01
S4 Giddiness	3.6	3.6	3.8	3.0	0.8	0.05
S7 Stool/urinary problems	1.8	1.5	2.1	1.8	0	n.s.
M1 Motivation/lack of initiative	3.2	3.3	3.4	3.0	0.5	n.s.
M2 Poor short-term memory	4.7	4.5	4.6	3.6	0.8	0.01
M4 Mental alertness	2.9	2.8	3.2	2.4	0.7	0.01
M7 Disorientation	2.3	2.2	2.3	2.0	0.2	n.s.
M9 Confusion	1.9	1.8	2.1	1.7	0.3	n.s.
I1 Sleep disorders	4.5	4.7	4.4	3.5	1.1	0.01
I4 Emotional instability	3.8	3.9	3.4	2.6	0.9	0.01
I8 Depressive mood	4.7	4.5	4.4	3.0	1.2	0.01
P2 Apathy	1.9	2.2	2.6	2.0	0.9	0.01
No. of patients	=30	=28	=45	=42		(statistical test: MANOVA)

The test «Speaking numbers backwards» is the most intellectually demanding of the four psychometric test instruments. Here, again, a highly significant improvement was shown for the test compound (Fig. 2).

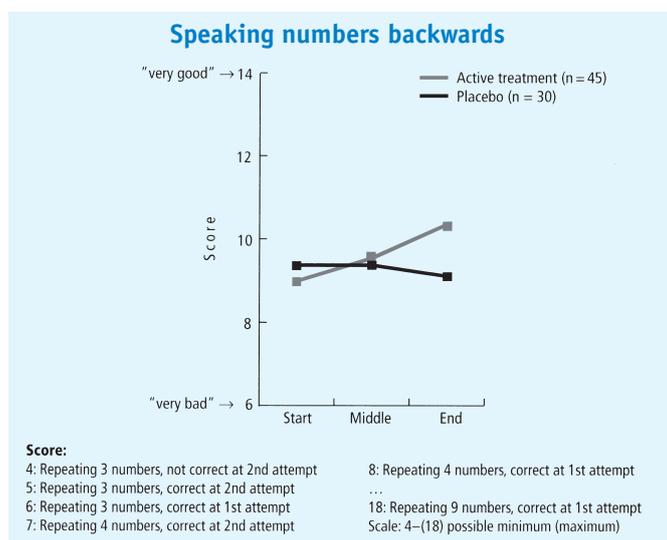


Fig. 2: Psychometry scales «Speaking numbers backwards»

The six-week check-up shows that important therapeutic progress was achieved only in the second half of the investigation period, and consequently that a longer period of treatment is indicated.

The course of the somatic geriatric findings was investigated using the GEDI scale (somatic geriatric diagnosis). All developments over time in unequivocal findings were highly significantly in favour of the active treatment (Fig. 3).

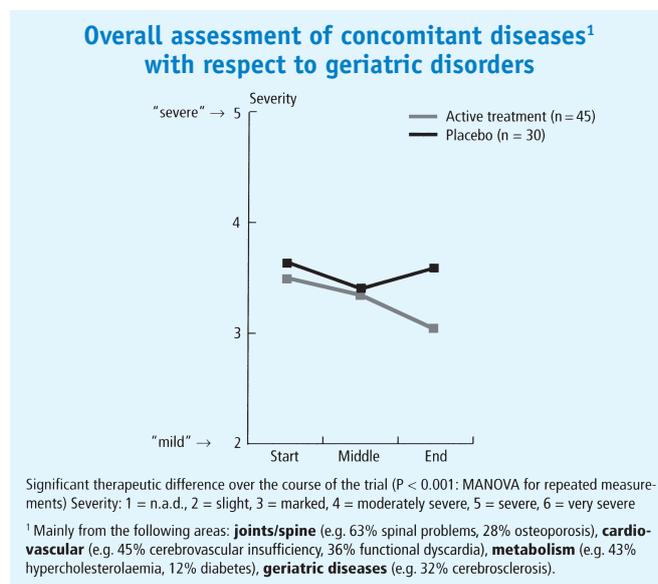


Fig. 3: Overall assessment of concomitant diseases (geriatric disorders)

Analysis of the older patients

A sub-group comprising 33 patients (44% of the whole group) was selected by setting «A = aged 70 or above». The initial values were higher than for the total sample group, corresponding to the higher degree of multimorbidity to be expected among older patients. The improvements in this sub-group were even more clearly in favour of the active treatment, both with respect to «motivation and initiative» and in terms of the doctor's overall assessment. These results support the hypothesis that the therapeutic use of the test compound has an effect on individuals aged over seventy, which is at least as beneficial as that on younger people.

Herbal yeast plasmolysate promotes the osteogenic differentiation of human mesenchymal stem cells

Summary of an in-vitro study with Bio-Strath® Food Supplement and Bio-Strath® Drops (herbal yeast plasmolysate)

The biology of bones

Our bones are subject to remodelling throughout the whole of our lives, with either breakdown or construction predominating depending on biological requirements. Excessive breakdown leads to osteoporosis while excessive build-up causes osteopetrosis (marble bone disease). Osteoporosis is a far greater problem in both medical and economic terms. Specialised cells in the body are responsible for bone construction and breakdown. Cells called osteoblasts

are involved in bone construction, while the cells responsible for bone breakdown are known as osteoclasts. Osteoblasts are created from mesenchymal stem cells (pre-osteoblasts) by means of biological regulation (signalling substances); osteoclasts are developed from haematogenic cells (pre-osteoclasts).

Bone breakdown (osteoporosis), such as occurs in the case of insufficient exercise, in advanced age and with poor nutrition, is the subject of urgent medical research. A sedentary lifestyle and a diet that is high in en-

ergy but low in nutrients and minerals may be causes of this disease of civilisation.

The impact on the bones of inadequate loading of the locomotor system can be impressively demonstrated in astronauts. Twelve months of zero gravity conditions in the International Space Station (ISS) result in loss of bone density of up to 20%. It takes over a year back on earth before bone mass has returned to normal. Bone breakdown in astronauts is combated by physical exercise and drugs.

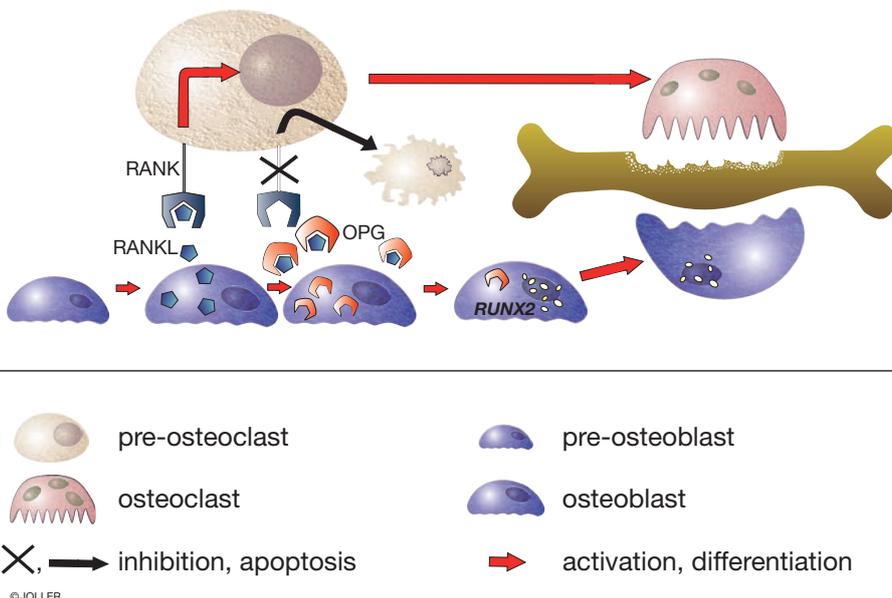


Figure 1: Biological regulation of bone construction and breakdown. The surface of pre-osteoclasts carries a receptor: RANK (Receptor Activator of NF-κB), that acts as a signal receiver. If this receptor is activated by the ligand, RANKL, of the pre-osteoblasts, the pre-osteoclast matures into an osteoclast that will break down bone. The signal is inhibited by the protein OPG (osteoprotegerin) of osteoblasts, which blocks the ligand (RANKL); the pre-osteoclast dies. If the pre-osteoblasts receive a signal to form RUNX2 (Runt-related Transcription Factor 2), they mature into osteoblasts that will build bone.

The study

In her specialist laboratory in the Department of Physiopathology at Florence University, Dr Monici investigated the influence of Bio-Strath® Food Supplement and Bio-Strath® Drops on the development of osteoblasts (bone build-up).

Modern methods make it possible to influence immature human cells (adult stem cells, mesenchymal stem cells) in cultures in such a way that they become osteoblasts. This is achieved by adding a cocktail (COD) of dexamethasone (a steroid hormone), vitamin C and glycerol phosphate to the cell culture medium. The subject of the research was whether Bio-Strath® was able to act in a similar way to COD.

The experiments were carried out under normal conditions and under zero gravity conditions (microgravity). An

apparatus known as an RPM allows the conditions found in space that are known to lead to loss of bone density to be simulated in the laboratory.

Immunofluorescence microscopy methods were used in this study to measure proteins that are required for the development of osteoblasts or the inhibition of osteoclasts. Molecular biology techniques (PCR) were used for an additional investigation to discover which of the genes necessary for the development of mature osteoblasts were activated.

As can be seen in **Figure 1**, the proteins, RUNX2, RANKL and OPG, play a decisive part in the regulation of osteoblasts, osteoclasts and hence bone structure.

The Monici study has now shown that both COD and Bio-Strath® cause increased formation in the osteoblast precursor cells (pre-osteoblasts) of the proteins RUNX2 and OPG that are

desirable to prevent osteoporosis, so that these precursor cells were able to mature into osteoblasts. On the other hand, RANKL remained unchanged by the administration of Bio-Strath®, so that there is no additional development of osteoclasts (**Photos 1 and 2**).

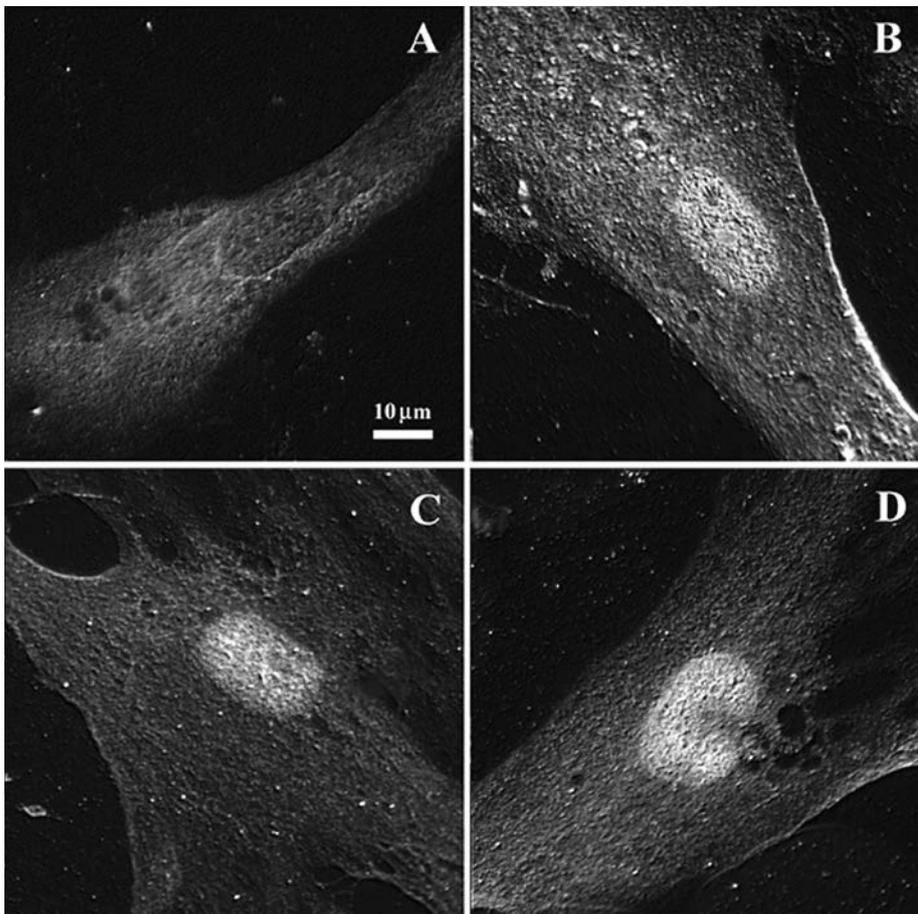
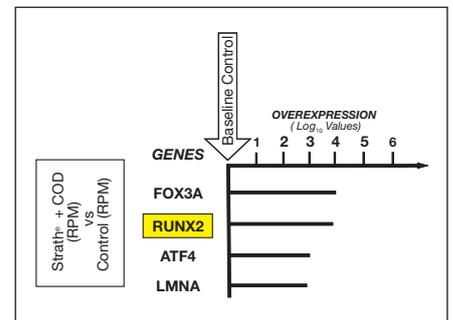


Photo 1. Immunofluorescence microscopy of RUNX2. (A) control, (B) treated with Bio-Strath®, (C) treated with COD, (D) treated with Bio-Strath® + COD.

The image clearly shows the increase of the protein in the cell nucleus of the pre-osteoblast treated with Bio-Strath® (B).



Selected PCR result. A combination of COD and Bio-Strath® under microgravity conditions increases the gene product, RUNX2, in the osteoblasts by more than 1000 times in comparison with the control.

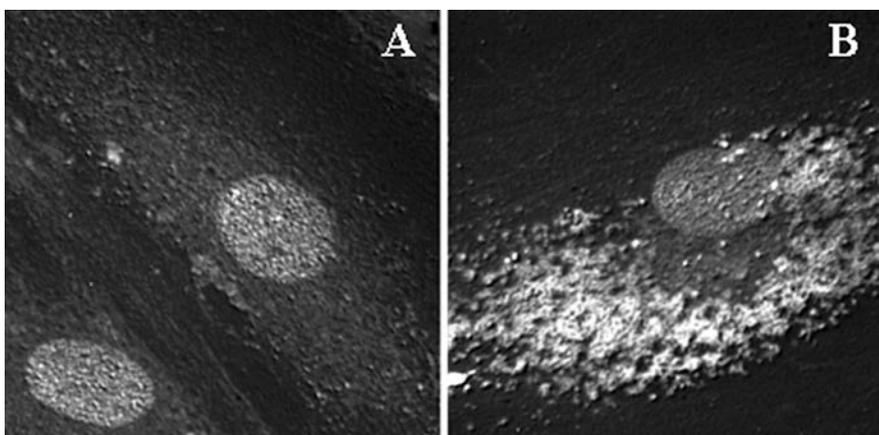


Photo 2.:
Osteoprotegerin (OPG) A) control; B) Bio-Strath®

As can be seen in **Figure 1**, osteoclasts only mature if the osteoblasts produce the RANKL signal and combine with the RANK on the pre-osteoclasts. This combination can be prevented by a protein, osteoprotegerin (OPG). The more osteoprotegerin is produced by the osteoblasts, the fewer mature osteoclasts develop. **Photo 2** impressively highlights the increase in osteoprotegerin caused by Bio-Strath®.

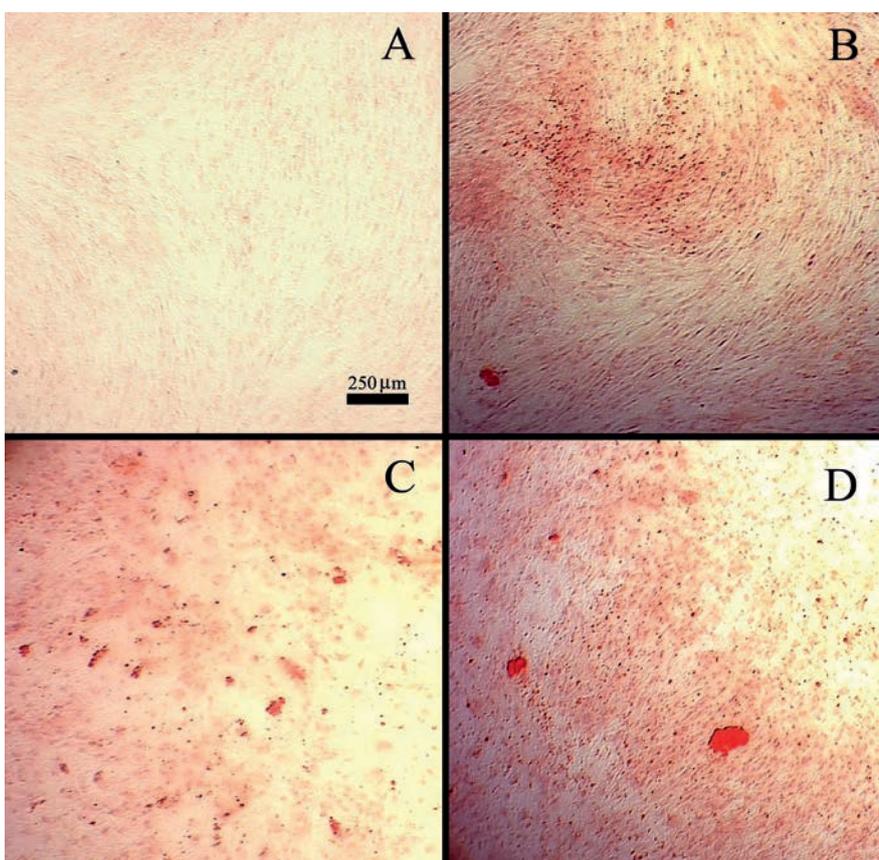


Photo 3: Staining of calcium deposits with Alizarin Red S. (A) control, (B) treated with Bio-Strath®, (C) treated with COD, (D) treated with Bio-Strath® + COD. Microscope slides of the cell cultures.

The detection of calcium deposits by staining with Alizarin Red S shows that bone mass really is formed by these osteoblastic cells (**Photo 3**). These regulation mechanisms for protein production and gene activation were seen to a greater extent when COD and Bio-Strath® were added to the cell cultures in combination. We can conclude from this that giving Bio-Strath® in combination with a therapy for building up bone density would be a promising approach.

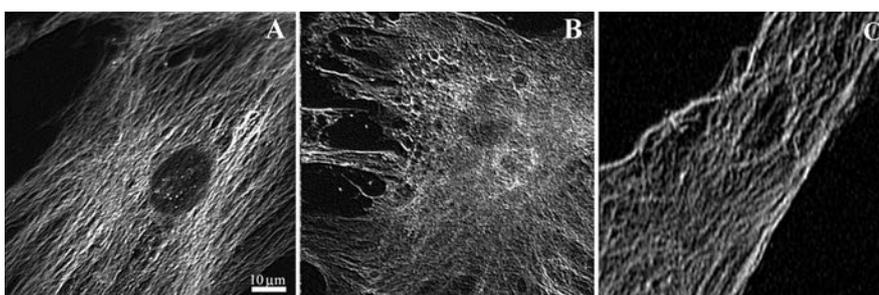


Photo 4: The cytoskeleton. (A) under normal conditions, (B) under microgravity conditions, (C) under microgravity conditions with Bio-Strath®.

Experiments investigating the influence of Bio-Strath® under microgravity conditions have already been carried out successfully with T-lymphocytes (strengthening the immune system). In the case of the osteoblasts, it was also seen that the loss of the cytoskeleton and hence the death of these cells under zero gravity conditions could be prevented by adding Bio-Strath®. The cell structure of the osteoblasts was stabilised in a similar fashion to that of the lymphocytes (**Photo 4**).

Summary

The most important laboratory results from the in-vitro study can be summarised as follows:

- The addition of Bio-Strath® clearly promotes maturation of cells that build up bone mass (osteoblasts).
- The formation of undesirable osteoclasts (bone breakdown) is decreased by adding Bio-Strath®.
- The action of an experimental cocktail of osteoblastic differentiation (COD) is clearly improved in combination with Bio-Strath®.
- A combination of drug therapy and Bio-Strath® could therefore be successful in osteoporosis patients.

Dr. Peter W. Joller
Clinical Immunology FAMH

Glossary:

Alizarin Red S Stain (dye) for the detection of calcium in a microscope sample

COD «Cocktail of Osteoblastic Differentiation»: dexamethasone, vitamin C, glycerol phosphate

OPG «Osteoprotegerin»; blocks RANKL and prevents maturation of osteoclasts

Osteoblast Cell that builds bone

Osteoclast Cell that breaks down bone

Osteopetrosis Marble bone disease

Osteoporosis Condition in which bones lose density

PCR «Polymerase Chain Reaction» quantitative, molecular biology detection method

Preosteoblast Osteoblast precursor cell from mesenchymal (adult) stem cells

Preosteoclast Osteoclast precursor cell from blood cells

RANK «Receptor Activator of NF- κ B» when combined with RANKL > formation of osteoclasts

RANKL «RANK Ligand», produced in osteoblasts > induces maturation in preosteoclasts

RPM «Random Positioning Machine», generates zero gravity conditions in the laboratory

RUNX2 «Runt-related Transcription Factor 2», causes osteoblasts to mature

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Analyses of Bio-Strath® Original Herbal Yeast

Average analytical values per 100 g Bio-Strath® Original Herbal Yeast

The ingredients are of a natural origin, so the values may vary slightly with each batch produced.

Basic determinations	Liquid	Tablets
Density	1,28	1,16
pH (electrometric)	4,95	5,89
Energy	1158 kJ/276 kcal	1363 kJ/326 kcal
Carbohydrate	57,20 g	28,10 g
Glucose	19,60 g	0,10 g
Fructose	23,60 g	0,10 g
Protein (f=6,25)	5,50 g	42,70 g
Fat	0,50 g	4,30 g
Alcohol (% w/w)	2,50	-
Dry matter	63,70 g	94,50 g
Minerals (Ash)	0,80 g	7,10 g
Synthetic colourings	negative	negative
Artificial sweeteners	negative	negative
Preservatives	negative	negative

Building substances	Liquid	Tablets
Lecithin	850,00 mg	3600,00 mg
Lecithin phosphate	51,00 mg	140,00 mg
Mannan	1530 mg	7750 mg
Glucan	710 mg	6630 mg
Glutathione	180,00 mg	290,00 mg
Choline	60,00 mg	420,00 mg
DNA (desoxyribonucleic acid)	28,28 mg	148,20 mg
RNA (ribonucleic acid)	200,40 mg	3593,90 mg
ATP (adenosine triphosphate)	790,00 mmol	not determined
L-Carnitine	8,90 mg	35,60 mg
Ubiquinone (coenzym) Q6	3,20 mg	10,60 mg
Ubiquinone (coenzym) Q7	0,07 mg	6,80 mg
Ubiquinone (coenzym) Q9	0,003 mg	14,80 mg

Vitamins	Liquid	Tablets
B1 – Thiamine	0,85 mg	47,00 mg
B2 – Riboflavin	0,56 mg	9,90 mg
B6 – Pyridoxine	0,25 mg	0,59 mg
Niacin	1,50 mg	18,00 mg
Biotin	0,002 mg	0,01 mg
Pantothenic acid	0,92 mg	4,20 mg
Folic acid	0,013 mg	0,054 mg
B12 – Cobalamin	0,0004 mg	0,0005 mg
C – Ascorbic acid	1,20 mg	2,32 mg
Inosit	53,60 mg	238,00 mg
Ergosterol (Provitamin D2)	52,10 mg	320,00 mg

Minerals and trace elements	Liquid	Tablets
Calcium (Ca)	9,00 mg	163,80 mg
Chromium (Cr)	0,004 mg	0,01 mg
Cobalt (Co)	0,016 mg	0,186 mg
Copper (Cu)	0,128 mg	0,31 mg
Germanium (Ge)	0,045 mg	0,20 mg
Iron (Fe)	1,22 mg	8,41 mg
Magnesium (Mg)	23,55 mg	97,50 mg
Manganese (Mn)	0,08 mg	0,93 mg
Molybdenum (Mo)	0,08 mg	0,40 mg
Nickel (Ni)	0,044 mg	0,057 mg
Phosphorus (P ₂ O ₅)	161,70 mg	927,00 mg
Potassium (K)	304,90 mg	2183,70 mg
Selenium (Se)	0,13 mg	0,226 mg
Silicic acid (Si)	1,75 mg	26,90 mg
Sodium (Na)	2,83 mg	164,10 mg
Total sulphur (S)	42,75 mg	122,60 mg
Tin (Sn)	0,16 mg	0,226 mg
Vanadium (V)	0,03 mg	0,075 mg
Zinc (Zn)	2,09 mg	9,84 mg

Amino acids (*essential amino acids)	Liquid	Tablets
Alanine	300 mg	2750 mg
Arginine	220 mg	2220 mg
Aspartic acid + asparagine	490 mg	3780 mg
Cystine	10 mg	210 mg
Glutamic acid + glutamine	570 mg	6150 mg
Glycine	220 mg	1780 mg
Histidine	120 mg	930 mg
*Isoleucine	240 mg	1750 mg
*Leucine	360 mg	2750 mg
*Lysine	310 mg	3020 mg
*Methionine	60 mg	540 mg
*Phenylalanine	220 mg	1500 mg
Proline	200 mg	1360 mg
Serine	260 mg	2170 mg
*Threonine	260 mg	2010 mg
*Tryptophan	60 mg	530 mg
Tyrosine	70 mg	1190 mg
*Valine	290 mg	2130 mg

Daily dosage recommended:

Elixir liquid	3×1 teaspoonful Liquid (=15 ml)	19,2 g
Tablets	3×2 Tablets	3,0 g

The raw materials used for Bio-Strath® are left in their natural state and supply 61 vital substances. These are present in biological equilibrium and are supplied in a natural manner so as to ensure optimum absorption. The individual vital substances are present in low quantities. They are not available at the recommended daily doses (RDA).

A unique production method

Natural primary yeast cells of the type «*Saccharomyces cerevisiae* Meyen» are used for production. The yeast cells are combined with more than 50 selected herbal extracts in the special Strath process. These herbal extracts are taken up by the yeast cells and metabolised. The precious Strath herbal yeast that is created contains many vital substances.

A natural, gentle fermentation process opens up the walls of the yeast cells (plasmolysis) so that the contents can be taken up by the human body. Without this plasmolysis, the yeast cells would pass through the body without being digested.

The plasmolysed herbal yeast that has now been created forms the basis of all the Strath® products.

The liquid form contains plasmolysed herbal yeast, malt extract (*gluten*), orange syrup and honey.

The tablet form contains plasmolysed herbal yeast, corn starch, pectin (binder), micro-crystalline cellulose (binder) and silicic acid (glidant).

- The vital substances are in a natural equilibrium.
- Not the quantity of vital substances supplied is important, but the availability for the absorption by our body.
- Function as a catalyst: Bio-Strath® Food Supplements help that also the vital substances from the daily diet are better absorbed.
- No overdose possible, long term treatment recommended, good tolerability.
- The Bio-Strath® preparations are free from artificially produced substances like preserving agents, colouring agents and flavouring agents.

Bio-Strath® Food Supplements are suitable for children and adults of all ages, pregnant women and nursing mothers, schoolchildren, professional people, sportsmen and women, and the elderly.

Bio-Strath® liquid



Bio-Strath® tablets



