

IN THIS EDITION

The influence of bioactive substances and physical exercise on the heart

This edition reports on the Alpro Foundation information session on 'The healthy heart – the influence of bioactive substances and sport'.

The health-preserving effect of vegetables and physical exercise with respect to cardiovascular diseases has been clearly established. Thus, adapting one's lifestyle and nutritional habits to these facts is crucial.

Bioactive substances in food are discussed and practical tips provided to adapt one's eating pattern. The role of soya protein in bringing about a decrease in cholesterol levels in children with familial hypercholesterolemia is examined in depth.

An important objective is motivating people to engage in physical exercise, even in old age and even if only to a limited degree.

alpro FOUNDATION

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SECONDARY PLANT SUBSTANCES STATE OF RESEARCH

Prof. Dr. Helmut Heseker, University of Paderborn, Germany.

Besides vitamins and minerals, foodstuffs of plant origin contain many other biologically active substances. These so-called secondary plant substances may be divided into different groups according to their chemical structure and functional properties.



The most important groups are carotenoids, phytosterols, glucosinolates, flavonoids, aliphatic acids, protease inhibitors,

monoterpenes, phyto-oestrogens and sulphides. These constituents are currently being closely examined with the focus on the physiological effects, gene expression and regulation of detoxifying enzyme systems.

Unlike the case of essential nutrients, insufficient supply of secondary plant substances have not been shown to cause any deficiency diseases. During digestion secondary plant substances are, however, released from food, absorbed, retained in the tissues and metabolised. For many of these substances, physiological and pharmacological activity has been demonstrated in studies on experimental animals and in vitro systems.

In epidemiological studies, interesting protective effects and a reduced risk of cardiovascular and carcinogenic diseases have been observed following a high intake of food of vegetable origin.

For example, with carotenoids, flavonoids, glucosinolates and sulphides in cell culture media, the activation of cancericidal enzymes and the regulation of cell growth has been shown.

Phyto-oestrogens, which are particularly present in soya products, but also in wholemeal products and vegetables, have antioxidant properties on the one hand and, on the other, bind with the same receptors as endogenous hormones.

In clinical trials the administration of soya protein produced a significant reduction in cholesterol levels. The effect was greatest when non-denatured soya products were used.

Secondary plant substances are therefore seen to be promising substances with considerable preventative significance. Wide-ranging, randomised, controlled studies of bioavailability and dose-response relationship in humans have as yet not been carried out.

(Literature list available on demand)

SOY-PROTEIN DIET VERSUS LOW SATURATED FAT DIET

EFFECT OF TWO DIETS IN CHILDREN AND ADOLESCENTS WITH FAMILIAL HYPERCHOLESTEROLEMIA

Prof. Dr. K. Widhalm, Department of Pediatrics, Division of Neonatology, Intensive Care in Inborn Errors, University of Vienna, Austria.

Familial hypercholesterolemia (FH) is one of the most common lipoprotein disorders caused by mutations in the LDL-receptor gene, with an incidence of approximately 1:500 in the general population.



Due to the fact that most affected subjects show symptoms (cardiovascular diseases in the fourth decade of life), it is generally accepted that children and adolescents

should be treated as early as possible in order to prevent later cardiovascular diseases. The basis of treatment is a diet characterized by low amounts of saturated fat and high amounts of unsaturated fats. However, most studies in children and adolescents show that diet can lower

cholesterol and LDL cholesterol in the range between 6-20%. Despite the fact that recently published data on children and adolescents underline the safety of cholesterol-lowering drugs, such as statins, it is obvious that all dietary measures to lower elevated LDL levels should be used before a decision for long-term drug therapy is established.

In recent years few reports have been published showing that substitution of soy protein for animal protein is able to act as an additional blood cholesterol-lowering

factor. So far, only studies for a period of several weeks and months have been published.

Study

The aim of our study was to investigate the effect of a soy protein substituted diet on blood lipids and lipoproteins in children and adolescents with FH compared with a usual low-fat, high-unsaturated fat diet. The evaluation of each period was, on average 3 and 5 months.

For this study, 12 adolescents (boys: n = 3, girls: n = 9, age: 9 years) with proven FH according to the American Academy of Pediatrics were studied (LDL cholesterol > 130 mg/dL; one parent affected with cardiovascular disease or hypercholesterolemia). All patients were referred to our clinic from other pediatric hospitals for further diagnosis and treatment.

All patients and their families were involved in a strict diet-education program. This included a basis dietary record for at least 3 d after information by a trained dietitian. Afterward, a diet low in saturated fats and high in monounsaturated fats was recommended (Diet I). Details of dietary treatment have been described elsewhere. Then a break (return to the usual diet) was performed and a second 5-month diet period was started. During this period animal protein was partially substituted by soy protein, thus the subjects had an intake of approx. 17-20 g/d soy protein (Diet II).

Results

All children and adolescents kept their diet records very strictly and were seen every four weeks by one of us and the dietitian. They tolerated the diet well and did not complain of any discomfort caused by the diet. Body weight did not change more than +1 kg within the study periods.

As seen in table 1 the habitual diet was characterized by a high fat content and a relatively low carbohydrate content. Diets I and II had a similar fat percentage within the range recommended for this age. The content of monounsaturated fatty acids was higher in diet I + II, and protein content was considerably higher in Diet II due to the addition of soy protein powder.

TABLE 1

Diet	Energy (%)	Fat (%)	MUFAS (%)	CHO (%)	Protein (%)
Before intervention		41	28	43	16
Diet I		32	31	49	19
Diet II (incl. 17 - 20 g soyprotein)		31	38	45	24

TABLE 2

Results*		Cholesterin mg/dl	TG mg/dl	LDL-C mg/dl	HDL-C mg/dl
Diet I	Begin	244,6 ± 40,0	94,0 ± 45,0	175,0 ± 41,0	49,6
	End	223,7	63,0 ± 15,0	159,4 ± 41,0	49,3
% change		-8	-33	-9	-1
Diet II	Begin	246,0 ± 41,0	93,0 ± 25,0	176,0	51,5
	End	217,0 ± 37,0	70,6 ± 21,0	150,6	48,6
% change		-12	-25	-15	-6
*Diet I vs Diet II		p < 0,05		p < 0,05	

The results of serum lipid and lipoprotein measurement show a clear reduction of total cholesterol during both diets, but the effect during Diet II was more pronounced (Table 2).

Discussion

It could be shown that both the low-fat diet and the soy-protein diet are able to lower elevated total cholesterol and LDL cholesterol levels, however, the soy-protein diet was able to lower to a higher extent.

In previous studies a conventional diet (Step I-Diet) was able to lower cholesterol and LDL cholesterol by approximately 10-20% as it has been shown in some other short-term studies. However, it is not quite clear from the literature how many pediatric patients do not respond to dietary therapy. In several studies in adults, substitution of soy protein has an additional cholesterol and LDL cholesterol-lowering effect.

So far, it is not quite clear by which mechanism soy protein is able to lower LDL cholesterol and which component (i.e. isoflavones, etc) is the effective substance. However, it seems to be very important to use all dietary measures that could support the cholesterol-lowering effect without using drugs.

Even in children the long-term use of drugs should be avoided as long as possible in order to prevent possible side effects and also to prevent a reliance on drugs. It is our experience that people who are placed on drug treatment do not want to adhere to dietary regulation because they think that the drug will do everything.

Further studies seem to be necessary in order to investigate the long-term effect of those dietary regimes containing soy protein.

(Literature list available on demand)

CARDIOVASCULAR TRAINING

PREVENTION OF CORONARY HEART DISEASE

PD Sportwiss. Birna Bjarnason,-Wehrens, German Sport University, Köln, Germany.

In Germany cardiovascular disease tops the mortality statistics. Lack of activity is an established lifestyle risk factor in the development of cardiovascular disease.



Additionally, epidemiological data has demonstrated the preventative role of physical activity and training. Data confirms an inverse relationship

between the risk of coronary heart disease and the level of physical fitness and physical activity, independently of any other risk factors present.

The relationship is dependent on the frequency and intensity of the activity, as well as the level of physical fitness. Physical fitness can protect against the damaging effects of other risk factors: the risk for physically inactive smokers is twice as high as for physically fit ones. Those at lowest risk are, of course, physically active non-smokers. It is important to understand that it is never too late to begin regular physical activity.

Even at an advanced age the taking up of physical activity has a life-prolonging effect. It is not yet possible to be exact about the optimum extent and intensity of physical activity. It would seem, however, that the greater the degree of activity and fitness and perhaps also the greater the intensity, the greater the preventative benefit.

The recently published European recommendations for the prevention of cardiovascular disease advises regular physical activity for all age groups from children to the elderly.

Moderate to intensive activity for at least 30 minutes, most days of the week – preferably every day – is recommended. The activity should be chosen so that it is fun and can easily be fitted into the daily timetable.

More recent research has shown, that even quite short training or movement sessions, such as going up and down stairs, walking quickly or gardening intensively have a preventative effect. To achieve the optimum benefit, stamina training is preferred. Optimally this should be carried out 4-5 times a week, for 30-45 minutes, with an intensity of 60%-70% of the maximum heart rate.

Before starting training a medical check-up, including a stress test, is advised. This is particularly important for elderly people who are new to physical training.

BIOACTIVE SUBSTANCES

FROM THEORY TO PRACTICE

Nutritionist, Karen Nespethal, Köln-Junkersdorf, Germany.

It is not always easy as a nutritionist to provide the consumer and patient with scientifically relevant information presented in a clear and palatable way. People are often aware of the necessity of eating healthily, less so about how this should be transposed into everyday life.



With regard to bioactive substances the trick is to talk with the customer about suitable foodstuffs rather than laying the emphasis on individual constituents.

Effective nutritional advice should speak to all the senses: it should not only be heard but it should also be seen, smelt and tasted.

Essential to this is careful listening – what does the customer really want (for example, why does he reject wholemeal products and raw fruit and vegetables)? The use of smell and taste tests – for example bread or an apple tasting test – will contribute to better understanding and so the altering of eating habits.

A practice-oriented culinary tour of everyday diet should always take account of the '5-points-a-day-recommendations' of the DGE (Deutsche Gesellschaft für Ernährung – German Nutrition Association) and the World Cancer Research Foundation (WCRF):

- Raising the intake of secondary plant substances through frequent consumption of fresh fruit and vegetables.
- Increasing the intake of roughage by means of wholemeal products and leguminous vegetables.
- Reducing energy and fat intake.
- Reducing the consumption of alcohol, sugar products and salt.
- Limiting the consumption of food of animal origin, in particular salted, smoked and overcooked products.

NEWS

The Alpro Foundation information session can be seen at the website

The complete presentations of the Alpro Foundation information session 'The healthy heart' can be seen and heard at www.alprofoundation.org

There you will find slides and spoken text for each of the 4 speakers, in English and German.

- Prof. Dr. Helmut Hesecker: Secondary plant substances
- Prof. Dr. Kurt Widham: Soya protein - Influence on lipoproteins in children and adolescents with familial hypercholesterolemia
- PD Sportwiss. Birna Bjarnason-Wehrens: Cardiovascular training - Prevention of coronary heart diseases
- Karen Nespethal, nutritionist: Nutritional tips for every day - From theory to practice

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