Cardiovascular Diseases

Origins and Therapeutic Possibilities

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If I speak in the tongues of men and of angels, but have not love, I am only a resounding gong or a clanging cymbal. If I have the gift of prophecy and can fathom all mysteries and all knowledge, and if I have a faith that can move mountains, but have not love, I am nothing. (I. Cor. 13. - New International transl.)

Along with cancer and diabetes, diseases of the heart and circulation are chronic diseases which proceed without any particular rhythm. It is impossible to pinpoint the exact moment at which they come into existence and gradually develop. Frequently, the people concerned only become aware of their illness when they go for a routine check-up or suffer some sudden alarming event.

In the western world, a heart attack still constitutes the number 1 health risk. For this reason, quite considerable efforts are being made to discover the causes of this „event", to reveal risk factors and eliminate them, or else to treat disorders which are already present or threatening to appear.

If the blood vessels of a human being were put in a row, they would stretch for a distance of 100,000 km, covering a surface area of 1,000 m^2. Our hearts beat around 100,000 times a day, moving a colossal volume of blood through the body to supply all the organs and cells. So we can appreciate that the vessels, along which the blood is transported, have to be healthy, to ensure optimal function of supply and waste disposal. Thus a person's vitality and regenerative capacity are critically dependent on the state of their blood vessels.

The vascular wall consists of a basal membrane, stratified epithelial cells projecting into the lumen, and towards the tissues, the membrane is covered with perithelial cells. Via these cells, the gases and substances pass which supply the interstice and the body's cells. Tiny particles also reach the tissues via small pores between the cells of the basal membrane. It is therefore extremely important that this passage is permeable.

Embryology

Human blood vessels begin to develop between day 13 and day 15 within the extra-embryonary mesoderm of yolk sac, the pre-development stage of the umbilical cord and chorion. Only two days later, the first embryonary blood vessels appear. The early development of the circulatory organs is connected with the fact that the yolk sac and egg cell now hardly contain any yolk material, so it is necessary to form vessels which, at an early stage, serve to provide a supply of nutrients and oxygen, carrying metabolic waste back to the mother. The so-called angioblasts originate from mesenchymal cells and group together in cell clusters. Within these islands of blood, fissures occur and certain angioblasts become endothelial cells, which group together at the edges of the fissure spaces. The vessels which are formed in this way, join up to form a network of channels with an endothelial lining. The enlargement of this network takes place on the one hand through the formation of new capillaries branching out, and on the other hand through connections which are made with other blood vessels which originated as separate entities. Blood serum and blood cells develop from the endothelial cells, as soon as the first vessels have differentiated themselves from the yolk sac and the allantois. The mesenchymal cells, from which the first capillaries were formed, differentiate into the muscle cells and connective tissue cells of the final vascular wall. By the end of the third week the blood circulation has already begun.

Towards the end of the third week, the development of the heart begins, in the form of two heart tubes of mesenchymal origin. These tubes rapidly unite, so that, by the 22nd day they have formed one single heart tube. Round about the 21st day, this heart achieves connection with the embryo's vascular system, and that of the pre-development stage of the umbilical cord, the chorion and the yolk sac. Further differentiation of the individual layers of the heart then follows. In the human being, the origination of the blood fluid and the formation of the blood cells in the liver, and later in the spleen, the bone marrow and in the lymph nodes, does not begin until the second month. The circulatory system is the first organic system to function in the embryo.

Historical

In order to understand the natural processes within the body, human beings thought out certain methods of measurement which they could use to measure physiological procedures. Since 1602, demonstrably precise observations and

records have existed regarding changes in the pulse rate, and in 1631, Sanctorius proposed the use of the first pulse meter, to enable the causes of changes in the pulse rate to be established, as well as the effects of influences on it. This was intended to expose the „articles of faith“ in medicine - handed down since Galen’s time - as errors and eradicate them. Initial anatomical studies were undertaken; Harvey discovered the major circulation (1628), and since 1779 observations were made on fluctuations in the pulse rate at different times of the day. At the court of Friedrich II the master of the music, Quantz, carried out intensive studies of the pulse as a source of the beat in music. He, too, was able to detect considerable fluctuations over the course of the day and arising from emotions being experienced. The metronome was invented in 1816.

Nowadays, we are able to measure blood pressure without shedding blood. We can get very accurate images of the heart and the vessels with and without invasive methods, and can list many parameters for the functions of the cardiovascular system and the composition of the blood. The circulatory system has become „measurable“ from the investigation of findings and comparison with standardised results. According to the extent to which examination techniques have advanced, we now have enhanced possibilities for influencing this organ system via interventions and medicines. Sections of blood vessels can be removed and replaced. Surgeons have learnt to perform open-heart operations, and last but not least, since 1967 it has been possible to perform heart transplants. Nowadays even artificial hearts and vessels can be implanted.

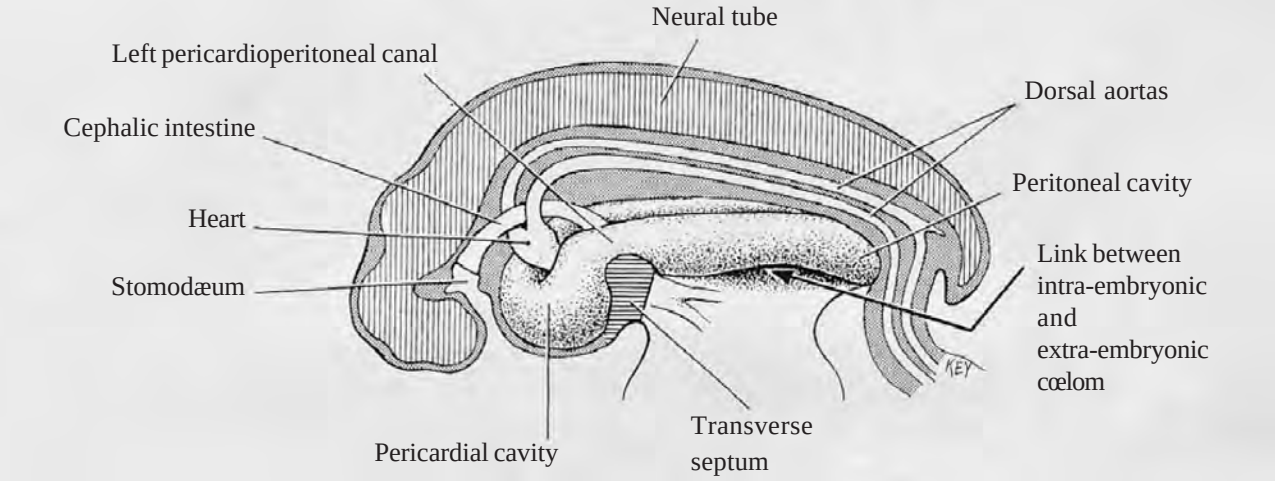

Fig. 1: Diagram of an embryo at Stage 12 (approx. 26th-27th day) following the unfolding. (from: Keith L. Moore, „Embryology“, 2nd edn. Schattauer, 1985)

Risk factors

If a disease of the cardio-vascular system is suspected, ECG readings and blood tests are carried out in order to avoid the necessity of surgical intervention. By comparing such readings and blood parameters certain risk factors can be established which obviously predispose towards cardio-vascular disease.

The main risk factors for cardiac infarct and stroke are, in random order:

- Arteriosclerosis,
- High blood pressure,
- Elevated cholesterol and triglyceride levels,
- Smoking.

There is a saying that a person is as old as their blood vessels. Arteriosclerosis correlates with the ageing of the blood vessels, and is regarded as one of the main causes of e.g. cardiac infarcts. Disorders of the fat metabolism are at the top of the list of triggering factors for arteriosclerosis. Fat metabolism is controlled predominantly by the surface receptors of the liver. Structural changes in the receptors and the ligands that belong to them (apolipoproteins) lead to disorders of the lipoid metabolism. In rare cases, genetic dispositions may need to be considered as causes. Where the cholesterol level is above 250mg/dl, a genetic disposition should be thought of.

These genetic defects often affect the LDL receptor and the Apo B100. They find expression in severe coronary symptoms and a reduced life expectancy.

However, in general, the reasons for disorders and illnesses in the cardiovascular system and the fat metabolism are to be sought in the lifestyle, the diet and other external factors of the individual patient.

Elevated cholesterol levels as well as normal levels where, however, the LDL levels particularly predominate and the HDL levels are reduced, give cause for concern. The combination of elevated triglyceride levels and elevated cholesterol levels is regarded as a significant risk factor. Nonetheless, it may be said that only 50% of the infarct rate is down to these factors. Inflammatory changes also have a decisive role to play in the genesis of arteriosclerosis. Despite world-wide efforts to reduce the cholesterol levels of the people concerned, the high mortality rate due to cardio-vascular disease has not been brought down. Nowadays, we suspect that it is some dysfunction of the endothelium that triggers this disease.

Development of Arteriosclerosis
According to current orthodox medical opinion, endothelial changes or injuries supposedly lead to an inflammatory reaction with increased leucocytes and LDL particles present in this area. This is followed by an accumulation of macrophages and oxidised LDL in this region. Possible causes of damage to the endothelium are environmental toxins and cigarette smoke, which lead to increased formation of free radicals, or general diseases such as diabetes and high blood pressure. Viral infections (herpes) or chlamydia or an elevated level of homocystein also may be causative. In every case, macrophages play a significant role by binding altered LDL particles and the excretion of pro-inflammatory substances. This is also the case in other chronic diseases, in which macrophages are significant, because of the mediators they excrete (rheumatism, MS, chronic inflammatory intestinal illnesses). By means of the phagocytosis of lipids from the blood, the macrophages become so-called foam cells (these are always formed when they take up harmful agents), which – in the form of plaques, cause considerable damage to the permeability of the endothelium. As a result, increasing amounts of foreign substances find their way through the endothelium into Pischinger's space, along with immigrating macrophages and leucocytes, favouring the inflammatory reaction. The under-supply or the dissolution of tissue can lead to necrotic areas within the growing plaques. Repair mechanisms are set off, which cover the ailing areas with fibrin. In the end, muscle cells immigrate, in order to maintain the function of the vessel. First, however, a weakening and bulging occurs at this site within the vessel; later on sclerosis and immigrating muscle cells create a stenosis in this area. An accumulation of platelets occurs, likewise serving to protect the epithelial defect, and this leads to an increased excretion of thromboxan A2, one of the most powerful vasoconstrictors, and leucotrienes, which promote the inflammatory reaction.

Of course, these plaques are subject to construction and degradation by the macrophages, in the course of which the protective coating of fibrin may be dissolved, so that necrotic cell debris can get into the bloodflow, possibly leading to thrombosis.

Lab tests are helpful in order to establish an increased accumulation of macrophages via the increase in fibrinogens and the CRP level, because plaques are frequently difficult to diagnose in an angiogram. C-reactive protein is a marker which is elevated in the early stage of inflammations, permitting conclusions regarding the danger of an imminent cardiac infarct or stroke, in conjunction with the fibrinogen content of the blood. Levels of CRPhis (high sensitive CRP) in the region of 2.1 mg/l of blood, compared with a basic level of 0.55 mg/l of CRPhis, point to a doubly increased risk of a stroke and a triple increase in probability of a cardiac infarct. It has not been possible to establish significant proof that smoking influences the elevation of CRP levels.

In conclusion, it may be stated that an elevation of CRPhis and the presence of HDL in the overall cholesterol are deciding factors in assessing the probability of coronary heart diseases.

Basing our treatment on these findings, its aim is to bring down the levels of fat in the blood. We have sufficient information regarding the risks which accompany the

taking of appropriate cholesterol-lowering agents. In only small quantities, some action could be demonstrated on the part of the cholesterol-lowering drugs. Other studies mention their ineffectiveness. Since the body tries, among other things, to repair damaged vessel walls using cholesterol, elevated cholesterol levels when needed are a thoroughly reasonable reaction. The body itself produces the cholesterol that it really needs. The surplus is consumed in the food. The main focus of prophylaxis and treatment must therefore be to achieve a natural change in these levels, to bring them into the optimum range. This can only be achieved by a change in lifestyle.

The principles of lifestyle change in cases of elevated LDL-cholesterol are:

- strive to achieve or maintain a normal body-weight,
- increase physical activity,
- abstain from smoking.

Table 1 shows a comparison of the actual and desirable levels, with regard to the average fat intake of people in the Western world. We can see clearly that the diet contains too many saturated fats which, in most cases, originate from products of animal origin. So far as vegetable fats are concerned, it is particularly cocoa fat, which consists almost entirely of saturated fatty acids. Regarding the fat content of the diet, 30% is a generally recommended level. For healthy people, the minimum they should aim for is a change along the lines of the following overview. If the dietary components are summed up together, an appropriate energy content of the diet should look like that in Table 2:

Tab. 1: Fatty content of the diet

	Is:	**Should be:**
Fat	37%	25-30%
Saturated fatty acids	17.4%	< 7%
Simple unsaturated fatty acids	15.4%	up to 20%
Polyunsaturated fatty acids	5.2%	up to 10%
Cholesterol	470 mg/day	< 200 mg/day

Tab. 2: Appropriate energy content

Carbohydrates	50-60%
Protein	10-20%
Fats	25-30%
Saturated fatty acids	Up to 7%
Simple unsaturated fatty acids	Up to 20%
Polyunsaturated fatty acids	Up to 10%
Roughage	30 g/day
Cholesterol	< 200 mg/day

Investigations were carried out to establish the way in which the composition of the fatty components and the amount of roughage influence the concentration of lipoproteins in the serum. Monks from a monastery were chosen as the test persons for this trial.

From Table 3, we may clearly see how great is the influence on cholesterol levels and particularly on the triglyceride levels in the subjects' blood, from the consumption on the one hand of large

Tab. 3: Influence of diet (various dietary plans) on indvidual serum lipoproteins

	A	B	C	D
Polyunsaturated fatty acids	5.2%	8.5%	**8.7%**	12.8%
Cholesterol (mg/2500kcal)	617	245	**252**	245
Fat	40%	27%	**27%**	40%
Roughage (g/2,500 kcal)	19	20	**55**	43
P/S quotient (polyuns./sat. fatty acids)	0.27	1.01	**1.00**	1.01
LDL cholesterol		- 26.5%	**- 34.5%**	- 31.5%
HDL cholesterol		- 12.0%	**- 10.6%**	- 31.5%
Triglycerides		0	**- 20.8%**	- 26.4%

amounts of unsaturated fatty acids, and on the other hand of large amounts of roughage.

With regard to dietary adjustment, it should be mentioned that it is prudent not to consume more than 30% fat in one day. The American Dean Ornish (Dean Ornish: „Revolution in Heart Treatment", Kreuz Verlag, 1992) recommends his patients to reduce fat intake to 10%, however, stressing that in all cases unsaturated fatty acids, just like alcohol, are metabolised to triglycerides in the body. For him, the main focus of attention in dietary prophylaxis of cardiovascular illness consists in abstention from animal fats. In Dean Ornish's view, the diet should look like this:

1. 10% fats (largely poly- and mono-unsaturated)
2. 70-75% carbohydrates
3. 15-20% proteins

Nevertheless, like other researchers, he has been able to prove in extensive studies that it is not only elevated cholesterol and triglyceride levels in the blood, which represent the sole risk of cardiovascular disease. There are other serious points, which favour the development of arteriosclerosis, increase the tendency to thrombosis and enhance the risk.

Hyperhomocysteinæmia

Hyperhomocysteinæmia is significantly linked with thromboembolism and chronic occlusive arterial disease of the lower extremities and the vessels of the brain and heart. A level which is elevated by 5 mmol/litre, constitutes a cardiovascular risk, one which occurs when the cholesterol level rises by 20 mg/dl. In 12% of cases of hyperhomocysteinæmia, genetic factors are present, making this one of the illnesses with the highest genetic contribution. Homocystein is an important stage in amino-acid metabolism, being remethylised on the one hand to methionine, and converted on the other hand to cystathion. The remethylisation takes place with the help of Vitamin B_{12} and Folic acid. Folic acid in particular is essential for the breaking down of homocystein to methionine. In the breaking down of homocysteine to cystathion, Vitamin B_6 is used, the end result being the production of cystein. It is possible to reduce the level of homocystein to 42% by giving doses of Vitamin B_{12} (1 mg/day) and Folic acid (650 mg/day). We should therefore think of supplementation with Vitamins B_6, B_2, Folic acid and B_{12}.

Smoking

Tobacco smoking leads to a release of nicotine and many carcinogenic substances, and these cause damage to the vascular wall, particularly through the creation of free radicals. The Carbon monoxide created when smoking diffuses via the alveoli, and there, it binds with hæmoglobin 300 times faster than oxygen. Thus, the hæmoglobin becomes a heteroprotein and simultaneously becomes functionally dead, as it is no longer available for transporting oxygen. Thus burdened, the erythrocyte hæmolyzes and discharges the carbon monoxide-hæmoglobin molecules into the plasma, where they give rise to heteroproteinæmia. So long as the endothelial cells of the capillaries and arterioles can

manage to break down these heteroproteins, the person remains healthy. However, if an accumulation builds up in the basal membrane, this causes a reduced permeability in the capillary wall, and this may be observed e.g. in the retina of otherwise healthy smokers. The bond between Carbon monoxide and hæmoglobin is very strong and therefore persists for up to 24 hours or longer. If further smoking takes place during this time, an accumulation will build up, with storage as described. Storage in the vascular walls provokes a state of endarteritis. This inflammation of the vascular wall constitutes a serious hazard for both circulation and heart, on account of the repair mechanisms which are set off. Basically, nicotine is the stronger toxin, it is true, but it can be rapidly broken down. Thus, what is really harmful about smoking is not so much the nicotine, because it is easily eliminated, but more the Carbon monoxide. So now, if a smoker moves over to mild cigarettes in order to reduce the nicotine intake and to be able to smoke one more a day, the toxicity of the smoking is actually increased, because more Carbon monoxide is created, with union of heteroproteins and hæmoglobin. Because of the increased erythrocyte destruction and hypoxia, hæmopoiesis is often forcefully triggered, causing a rise in the hæmatocrit to levels between 50 and 60 vol.% in the blood. The smoker's infarct is preprogrammed.

Hyperproteinification

Heavy consumption of proteins, particularly those of animal origin, causes the body to deposit the excess of protein in storage. According to research carried out by Prof. L. Wendt and others, it can be demonstrated that - because of increased pinocytosis of the endothelial cells, e.g. where the blood viscosity is increased and the speed of the blood flow reduced - the augmented uptake of protein is stored in the basal membrane of the capillaries. Thus, where the endothelial cells are morphologically intact, plaques may form in the subepithelial space. However, once the irritation and any possible damage have ceased, these can be reversed. This is true of all the vessels in the body in general, and of vessels in the brain in particular. Physiologically speaking, storage may occur in a variety of tissues and tissue parts:

- Subcutaneous tissue
- Interstitium
- Capillaries
- Blood store.

Within the context of cardiovascular illness, the storage within the capillary walls and later, also in the walls of the larger vessels plays an important part. A thickening of the basal membrane of the capillaries occurs when the fibrous structures and cells of the interstitial connective tissue are overloaded with proteins. Of course, this tailback into the vascular walls and blood causes the protein concentration in the blood to get higher and higher. This can be measured, amongst other ways, in an elevated hæmatocrit level and in an elevated fibrinogen content in the plasma. In the darkfield blood image, one can see strong fibrin networks, a thickening of the erythrocyte membranes, and adhesion of the erythrocytes to each other. Hand in hand with the elevated protein levels in the blood, we also see elevated levels of lipoproteins in the plasma. On the one hand, this is because an excess of animal proteins always indicates that there is also a marked excess of animal fats. On the other hand, the congestive storage means that the triglycerides and cholesterol can no longer escape from the blood pathways owing to the transposition of the „transit routes". In order to safeguard supplies to the tissue cells, the blood pressure is raised. The increased storage of euproteins and heteroproteins in the vascular walls and the membranes of blood cells and tissue cells results in a marked loss of flexibility in the vascular walls and cells, particularly the erythrocytes. The raised pressure in the vascular system is made possible by increased work on the part of the heart and increased muscle tone in the muscular cells of the vascular walls. Both factors diminish the supply especially of oxygen, water, nutrients and micronutrients to the heart- and vascular muscle cells, on the one hand, and of the elimination of metabolic waste on the other hand. For this reason, initially, there is a further rise in the blood pressure, and later on, there are also painful conditions in the most varied places in the body, and of course in the cardiovascular system, because of the incipient hyperacidification. One particular form of high blood-pressure is renal hypertension, which accounts for 7-10% of all cases of hypertension. With regard to this, we must bear in mind that precisely renal hypertension may be caused by overacidity of the body and transposi-

tion of the membranes, because too much animal protein has been deposited, along with much too much salt in the diet.

When animal proteins are consumed, the excretion of insulin is also stimulated. At the same time, HMG-CoA-reductase is activated. This enzyme is the key enzyme for cholesterol formation. Vegetable proteins contain more arginine than lysine, whereas animal proteins are rich in lysine and leucine. Among other things, the cholesterol-lowering action of soya products is based on the arginine content. A high consumption of lysine in animal proteins results in arginine increasingly being built into atherogenic apoproteins such as Apo E. This again is the transport molecule for lipids and cholesterol. Vegetarian food lowers the concentration of cholesterol. A very advantageous relationship between LDL and HDL has been partially demonstrated, the LDL of vegetarians being less susceptible to oxidation than that of people eating a mixed diet. This, of course, is to do with the high proportion of anti-oxidative components in vegetarian food.

The fatty acid pattern of cell membranes is substantially determined by the fatty acid intake in the diet. This composition has a considerable influence on the sensitivity of the insulin receptors, and this again acts positively on type 2 diabetes. A high dietary intake of saturated fatty acids means that the receptors have a diminished insulin sensitivity, and it promotes resistance to insulin. Thus, a western type of diet with a lot of animal products strongly favours the onset of type 2 diabetes.

Elevated storage levels of iron increase the risk of cardiac infarct quite considerably. Hæmiron, which comes from animal blood or red meat, is easily absorbed, as is the iron it contains. In the case of red meat, the absorption is 10 times better than in the case of vegetable iron. However, superfluous iron forms free radicals and damages the LDL through oxidative stress. For its part, this oxidised LDL is the origin of foam cells (xanthoma cells) and arteriosclerotic plaques. Vegetarians have only slight iron storage, and this again favours insulin sensitivity.

Cardiovascular organs - Formations of the mesenchym

In my account of the embryonic development of the cardiovascular system, it was made clear that the vessels are formed first, and that the heart tubes do not connect with the capillaries until later. The buds, from which vessels and heart grow are of mesenchymal origin. The mesenchym provides the cells of origin for connective and supportive tissue in our bodies. From the anthroposophical point of view, the mesenchym is where the formative or etheric energy has its seat. Others also consider it to be the organic vehicle of immaterial order (Uexkuell), or the vehicle of the metabolic fields and developmental differential (Blechschmidt), and finally Sheldrake regards it as the vehicle of the morphogenetic fields. On the one hand, this means that a blockage may arise in this tissue, if the exchange of body fluids is disordered, which may present in purely material terms as an increase in circumference, in a change in consistency from elastic to hardened, in degeneration of cells and tissues - all of these may be associated with pain (e.g. rheumatism) - and finally, there may even be neoplastic growth. On the other hand, long before the onset of material change, some disturbance or obstacle to the flow of information exists within the mesenchym. The cardiovascular system, the respiratory organs and those of the digestive tract - predominantly situated near the centre of the body - make up the rhythmic system of the human body. The functions of these organs are subject to rhythmic pulse-providers.

Rhythms

One prominent feature of nature, both living and inanimate, is its rhythmic order. There are biological rhythms with a frequency of:

- milliseconds (e.g. neuronal discharges)
- seconds (heart frequency, waves of electrical activity in the brain)
- several seconds (respiration)
- minutes to hours (rhythmic release of hormones)
- one day (circadian rhythms, e.g. temperature, liver function, blood pressure, waking and sleeping) - influenced by the rotation of the earth on its own axis
- one month (woman's lunar rhythm) - dependent on the phases of the moon
- one year (seasonal rhythms, circannular rhythms affecting fertility of animals, growth and reproduction of plants according to their region) influenced by the rotation of the earth around the sun.

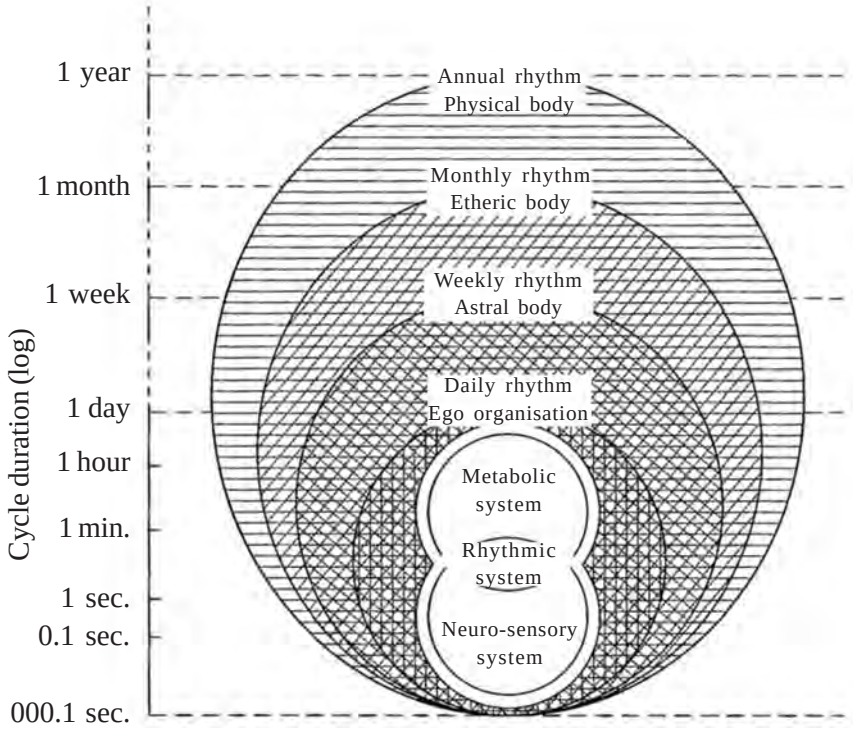

Fig.2.: Hierarchical order and effect on each other of the human rhythms (from G. Hildebrand „On the physiology of the rhythmical system") in Bernd Roßlenbroich: „The rhythmic organisation of the human being", Free Spiritual Life (Freies Geistesleben), 1994.

Circadian rhythms continue even if the external timers for the internal clocks cease to exist, e.g. if light is excluded, meal times or social factors changed (Aschoff bunker experiments). The endogenous rhythm remains constant. The task of the external timers is to synchronise the internal clocks according to the geophysical 24-hour day. Circadian clocks are genetically determined: such „clock genes" have been found in the fruit fly, the mouse and the hamster, and likewise in the human being, in the skin. In the human being, the internal time-beater is located in the CNS, in the suprachiasmatic nucleus.

It is rhythm that the chest organs, heart and lungs, have in common. The frequencies are counted in seconds. The relationship of the rhythms, e.g. heart activity and respiration, to each other is characterised by a whole number in the healthy person, e.g. 4:1. Even in disorders, or increased work, the body strives to maintain a whole-number rhythm, e.g. 3:1 or 5:1. The same conditions also underlie the rhythm of the abdominal organs; there too, in the various divisions of the digestive organs, the body likewise attempts to maintain a whole-number rhythm.

Basic arterial oscillation

The pulse wave triggers another rhythmic phenomenon, the so-called basic arterial oscillation, which lies below that of the pulse with a periodic duration of 0.3 to 0.5 seconds. It is based on a reflection of the pulse, for in the minor arteries, especially where they branch, the pulse wave bounces back and returns to the heart, where it collides with the closed aortic valve, and is reflected off again. And so it runs back and forth through the vessel. If one imagines this procedure taking place in a glass of water, with the wave being reflected off the glass wall, the reflection becomes comprehensible, although admittedly, in the blood vessels, this is much more marked, because the vascular walls are elastic. The frequency and amplitude of this basic oscillation are dictated by the properties of the vascular walls (cf. the glass of water) and less so by the function of the heart. The elasticity of the arteries, the size of the body and thus the length of the arteries all have a part to play.

At the same time, the blood pressure varies to maintain synchronicity with the respiration. When the body is at rest, the wave through of blood pressure coincides with that of inspiration, and the rising curve with that of exhalation.

Finally, there are also swings in blood pressure which are slower than those determined by respiration. They are subject to a 10-second rhythm, and are therefore known as the 10-second rhythm. As a result of the variation in blood pressure due to synchronicity with respiration, a build-up often occurs, so that this 10-second rhythm is not measurable; in that case, the respiration can be changed and the rhythm then becomes visible and measurable.

Heart and respiration act rhythmically within the range of seconds and minutes; however, the blood pressure and composition of the

blood are also subject to rhythmic variations associated with the time of day. In 1922, Katsch and Pansdorf were the first to publish their observations: that even in patients with high blood-pressure, variations could be registered at certain times of day. At that time, it had long been known that this was true of healthy people. At the same time, however, they recognised that patients with uræmia have an abnormal blood-pressure rhythm. Nowadays we would call this a classic secondary hypertension with inverse daily rhythm.

The circadian rhythm of the blood-pressure has been shown to be the same in Europeans, Asians and Africans, and it develops in the first months of life. It remains the same right into old age. A typical pattern is a decline at night with a rapid rise in the morning and frequently - but not regularly - a lesser peak in the evening. This secondary evening peak occurs in many cases in elderly people. The cause of this is not understood. There is discussion as to whether there is a link with the siesta in older people; however, it also occurs when they are not allowed their siesta. The nocturnal lowering of the blood pressure in healthy people is known as „the dipper". It amounts to more than 10% of the day's level for systolic blood pressure, and 15% for the diastolic. Basically, the circadian profile of the blood pressure in those with hypertension does not differ that much from that of a healthy person, except in the elevated mean levels. But in their case, there is an increased incidence of „non-dipper", i.e. the depressed level is not more than 10% systolic or 15% diastolic at night. Frequently, this phenomenon can be construed as a sign of end-organ damage. This conclusion is based on findings in patients with secondary renal hypertension. These, and those with endocrine hypertension, miss out almost completely on their nocturnal dip in pressure. The same phenomenon may be observed in diabetics with nephropathy, which goes to emphasise the great importance of the kidneys in the circadian regulation of the blood pressure.

Circadian rhythms of cardiovascular events

It has been known for a considerable time - and this fact has been firmed up by extensive studies - that there is a morning peak in *angina pectoris attacks* and, according to some authors, another peak in the late afternoon. A lack of oxygen, or an increased need of it, is suspected at these times. But there are signs that, precisely at those peak times, there is an increased tension in the vessels, both coronary and peripheral. These signs were confirmed after alpha-adrenoreceptor antagonists had been prescribed, because as a result of these doses, it was possible to eliminate the daytime variations completely. Alongside the intensification of vascular tone via the sympathetic nervous system, in the early hours of the morning, there is an increase in blood pressure as a result of increased heart activity arising from raised heart frequency. All this results in increased strain on the heart and possible deficiency in the oxygen supply to the heart muscle with intensification of vascular tone, the consequence being a possible attack of angina pectoris. The increase in heart frequency is explained by an increase in activation of beta-receptors of the heart and the rise in blood pressure because of the activation of vascular alpha-receptors. The stimulation of the sympathetic nervous system is regarded as having a direct relationship to waking and rising. However, it is known that even before waking, there is an increase in the level of noradrenaline in the blood. Of course, the change from lying to standing influences the sympathetic nervous system, and this may be observed on getting up at night and after the siesta, in the form of myocardial ischæmic attacks. In a person who takes regular siestas, the risk of myocardial infarct is doubled, compared with people who carry on without a break for rest. These results are analagous to the risk of morning ischæmic attacks. Thus, one cannot „sleep through" the risky time; it simply exists.

Should one think that there were contradictions between endogenous and exogenous time-beaters, then it merely appears to be so, because the endogenous ones can be masked by an exogenous time-beater. For instance, it has been established that the circadian rhythmics of myocardial ischæmias are preserved, even if changes are made to the factors which are influenced by activity. That takes us back to the endogenous time-beaters, which carry on providing their impulses continuously. The aim of treatment must therefore be to maintain the stresses induced by the sympathetic nervous system at the lowest possible level.

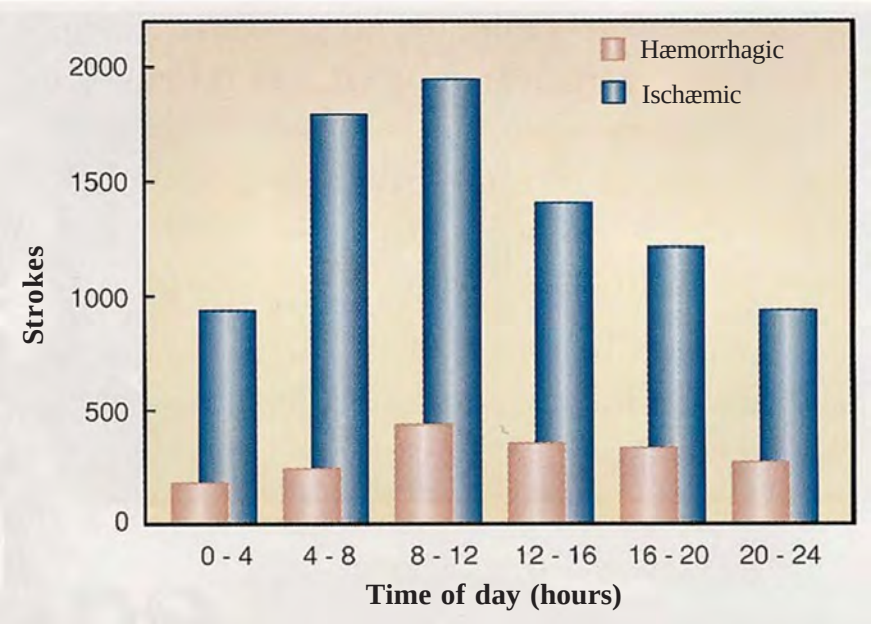

Fig.3: Daytime incidence of ischæmic and hæmorrhagic strokes. Both forms of cerebrovascular accident exhibit a circadian rhythm, with increased occurrence in the morning; data from a meta-analysis by Elliot (1998). (From „Biological rhythms and cardiovascular illnesses": Prof. Dr. Björn Lemmer and Independent Lecturer Dr. Klaus Witte, 1st ed. UNI-MED, Bremen, 2000)

As well as angina pectoris, there is also Prinzmetal's angina which, as against angina pectoris, is independent of stress. It originates nocturnally in spasms of the coronary vessels. If it occurs in the daytime, the difference is that it arises from a vagotonic vascular spasm. Now, we know that asthmatic attacks also frequently occur at night, and can be traced back to a cholinergic impulse of the parasympathetic. Therefore, it seems reasonable to suppose that Prinzmetal's angina may likewise be attributed to a particular activation of the parasympathetic, or at least to an imbalance between the two components of the autonomic nervous system. Admittedly, this is not yet known precisely. This would fit the case history of a patient who was facing the possible amputation of one leg owing to deficient peripheral circulation. In the clinic, as a last resort, the branch of the sympathetic nerve which serves the leg was severed, because they wanted to avoid a possible vascular spasm in the lower limbs. However, this intervention was not crowned with success. Receptor-blockers had been administered for the same effect, but this attempt was also a failure. The rhythm of blood supply and drainage for this area of the body was completely cut off, because the vagus part of the autonomic nervous system had lost its opposite number. Thus, a kind of bog had been created, lacking any rhythm, which was no longer capable of any supply or drainage of fluid.

„The doctor's intervention alters nothing fundamental about this situation. He steps into the life situation which has necessitated the insight into illness. He is supposed to help, particularly in the restoration of the lost equilibrium, and especially the healer of today knows that this means not only the removal of somatic defects, but the restoration of balance in the life situation of this person who has lost their rudder. Thus, medical intervention itself is in danger of causing a new imbalance whilst trying to help, and not only by means of a „dangerous" intervention, which upsets other balanced relation-ships, but also above all because of the way the sick person is placed in a totality, which is not easily grasped: a totality of emotional and social tension." (Hans-Georg Gadamer: „Über die Verborgenheit der Gesundheit" (= On the hidden nature of health). Suhrkamp Verlag, 1993.

Myocardial infarcts likewise occur more frequently in the early morning than at other times of day. A typical scenario is the rupture of an arteriosclerotic plaque, accompanied by a thrombotic vascular occlusal. Therefore certain clotting parameters must be of significance, as well as the enhanced tendency of the deposits on the vascular walls to rupture. In fact, there are signs that the tendency of the thrombocytes to clump together is particularly strong in the morning, and that at the same time that of the antagonistic anti-clotting factors in the blood is particularly weak. This explains the heightened risk of infarct in the morning, on the one hand, because of the rupturing tendency of the plaques owing to the unfavourable cardiovascular conditions on waking and rising and, on the other hand, because of the depression of the factors which

inhibit clotting and protect the body. To sum up, we can emphasize: it is ischæmias in the morning, because of the increased oxygen requirement, which result in angina pectoris attacks and silent myocardial ischæmia, and the increased tendency of plaques to rupture and increased clotting potential, which cause cardiac infarcts in the morning. The increased nocturnal occurrence of angina attacks of the Prinzmetal type probably has its cause in vasoconstriction, similar to the broncho-constriction in nocturnal asthmatic attacks.

In every case, vascular spasms result in an aggravated risk of suffering from cardiovascular disease, or even of death. In the USA, the annual consumption of Aspirin amounts to 15 million kg. Aspirin considerably reduces the risk of a heart-attack; instead, however, there is an increased risk of cerebral or gastric hæmorrhage, and sudden death from heart disease.

In this connection, it is interesting to note the finding that, in autopsies of patients who died from cardiac infarct, the vessel where the blockage occurred was filled with blood both before and after the occlusal. The cause of this may well be the backward and forward flow of blood, which occurs as a result of the basic arterial oscillation. However, it is also conceivable that the actual trigger of the infarct is really only situated in the capillary area. Apart from this, autopsies of young accident victims and soldiers from the war in Vietnam have revealed that the onset of arteriosclerosis can occur even between the ages of 18 and 20. Now of course, we can consider the possibility that our altered way of life and day-to-day stress may be contributory factors, but at the same time, this finding makes us wonder whether arteriosclerosis in the major supply vessels can really be regarded as the main risk factor for cardiovascular problems. The findings of these autopsies also provide evidence to support the contention that the main problem is situated in the capillary area and in the ongoing under-supply and deficient drainage of the interstice.

What is more, feigned heart operations have been carried out, the patients being told that they would be fitted with a by-pass, but in reality were only given an incision while under the anæsthetic, and it has been demonstrated that 70% of those „operated on" in this way felt in good health afterwards and had no complaints, whilst the other 30% had to undergo another operation which was real. Apart from this, it is known that, in the wake of an operation with general anæsthetic, $^1/_3$ of patients suffer either temporary or permanent neurological damage, or a drop in their IQ. And then, in 50% of those who have surgery, the vessels are blocked again after five years, and in 80%, new stenoses occur over a period of 7 years as well. (See also „Gesünder leben" [= live more healthily] by Dr. Peter Schmidsberger, Mosaik Verlag, 1987, and „Revolution in der Herztherapie" [= Healing from the Heart], Dean Ornish, Kreuz Verlag, 1992).

Heart dysrhythmias and sudden death from heart disease

Cardiac dysrhythmias may result from ischæmia of the heart muscle, or from a disturbance in the excitability or in the conduction of excitation in the heart muscle. Sudden death from heart disease, however, is more likely to be the result of a ventricular dysrhythmia with fluttering and flickering. In most cases, autopsy reveals a plaque rupture in the coronary vessels with thrombi projecting into the lumen. This leads us to conclude that sudden heart death is mostly down to acute myocardial infarction. Therefore, the daytime rhythm of these diseases is characterised by a peak in the early hours of the morning.

The same can be seen regarding the occurrence of ventricular tachycardias: 1. More during the day than at night; 2. peaking in the morning; 3. frequently also an additional, lesser rise in the late afternoon.

Rhythmics have nothing to do with illnesses of the circulation and heart, but may also be observed in healthy people. Thus defibrillation is also least effective in the morning, just when most attacks occur.

Good order in rhythmical matters

In order to recognise the true nature of that which is rhythmic, we need to imagine the opposite, which is polarity. On the one hand we have the beat, the continually recurring movement, remaining constant and, on the other hand, the chaotic principle of chance, arrhythmia. In the beat, it is coldness that predominates, in arrhythmia, it is

warmth. The essence of being rhythmic is balance, the flowing harmonic alternation of heat and cold, of tensing up and relaxing, expansion and contraction, as need dictates.

According to Gadamer, health is a state which is situated in what is hidden, whereas in illness, disharmony emerges. This is expressed either as a continual contraction and coldness (earth - water), or in the form of dissolving and warmth (air - fire). Rhythm itself is actually incapable of becoming sick; it can only lose its harmonising function. However, the result of this is frequently a life-threatening state.

In the course of investigations into the rhythm of heart-beat and respiration, differences in the ratios ranging from 2.5:1 and 10.3:1 were found over the day. After several hours of sleep at night, however, these subjects showed a return to the regular 4:1. This straight pulse:respiration ratio of 4:1 is a basic principle of order in this system. This order is attained most strongly at night during recuperation and relaxation while asleep. As morning approaches, this ratio is once again abandoned in a typically individual way. Only a few of the subjects in the trial also maintained this ratio of 4:1 in the daytime. Now, if a person is continually woken during the night (to empty the bladder, etc.), the optimum ratio of 4:1 cannot be properly attained, and the person is not refreshed. This ratio is the precondition for an optimum performance by the organism. People taking part in trials, who naturally possessed this optimum ratio before an exertion, recovered the most rapidly after the stress, reaching the optimum ratio of 4:1 single-mindedly.

Stress

Stress prevents the natural relaxation of the musculature, so that, for instance, a permanently increased tone is created in the vascular muscles. As a result of the contraction of the musculature, the blood pressure increases, and with it the tendency to thrombosis. In those with heart disease, the setting of simple arithmetical tasks is enough to cause a measurable decrease in the blood supply to the heart. These people are often under ongoing internal stress, feel isolated, and the smallest tasks bring them to the limit of their capabilities. Anxieties result in sleeplessness, and consequently, it is not possible to achieve rhythm.

Experiments were carried out on monkeys, in which the animals were fed a diet very rich in fats. Astonishingly enough, only certain animals rapidly developed arteriosclerosis with all its associated problems. On closer scrutiny, it was realised that, on the one hand, it was the highest-ranking male animals that became ill and, on the other hand, the weakest females in the group. The highest-ranking ones were constantly under stress on account of fighting their rivals and worries about being „top dog“. They were under so much tension that the mere sight of the researchers was enough to send their blood pressure and pulse-rate shooting up. The weakest female animals were likewise under constant stress, because they were being driven away from their feeding and sleeping places and had no proper social bonds. The animals between these two extremes had intensive social intercourse (mutual de-lousing and caressing) and also the lowest degree of arteriosclerotic change, although they were consuming the same unhealthy, fatty diet. The lesson to be learnt from this - at least as far as the apes are concerned - was that the males at the head of the order of precedence should show themselves as less domineering and the females should not allow themselves to be put down so much, for among these latter animals 50% of them also had a disordered cycle, because of their stressful life situation. We know from the research carried out by Hans Selye that, in enchained rats when subjected to stress, a bleeding stomach ulcer developed within the space of 12 hours. In the heart, ongoing excretion of adrenalin as a result of the calcium channels being open results in coronary spasms, and with this the self-destruction of the heart from an inability to relax.

Macrocosm - Microcosm

In the hermetic view, the sky is an energetic centre of the macrocosm, in the midst of which the sun stands, a beaming light. The human being, who is equated with Earth, sees himself in this connection as the centre of the microcosm. As there is a central point in the sky, there must also be one in the human being on Earth, and so the heart became known as the central point of the human being (Paracelsus). Seen from this angle, the sun has a powerful effect on the heart, and this has a central action on the body. This is expressed very clearly in

Robert Fludd's portrayal of microcosmic man. Thus, the heart is the sun within each human being, with a material correspondence in gold (Aurum; „Aur" = light; or synonym for „God's spirit"). This makes the body the temple of God's spirit.

For millennia, people have believed in a body which has a soul, and whose spiritual centre is the heart. Because of this, in cults which revered the dead, the heart was given a separate burial, because it was understood to be the bearer of magical spiritual powers and believed to be immortal.

Hildegard, too, spoke of the heart as the dwelling-place of the soul. She believed that our thoughts proceed from the heart, and are transformed in the brain.

Meanwhile, the taboo of leaving the dead in peace was broken and the soul banished from the body, as we researched the anatomy and functions of the heart more and more intensively.

Nevertheless, illnesses of the heart and circulation are steadily on the increase and every second person in the industrialised nations dies from them. Amongst those peoples who live more natural lives, such illnesses are very seldom to be found. Possibly this is because their hearts still contain a soul, making them less susceptible to disturbance. Maybe they are delivered from hardening and soullessness of their hearts by their involvement in cultic rituals, their fertile imagination and their social structure with strong links to their ancestors. People in the western, „civilised" world suffer particularly from increasing isolation and from a compulsion to assert themselves and impose their wills. Nobody asks them about their emotions, and therefore they do not divulge them.

Right up to the present time, figures of speech have survived which show that we have retained the link to the mental and emotional source in our hearts within our archaic memory. We talk about our heart's desire, a broken heart, a craving from the bottom of our heart, and we express our heartfelt thanks. We also know the language of the heart, warm-heartedness, cold-heartedness, a heart of stone, or a heartless person.

This aspect of the heart and its function in our lives is to some extent contradictory to what medicine can measure and describe. Science regards the heart as a kind of pump which can, for instance, raise the blood pressure to overcome resistance in the vessels. In so doing, we underestimate the fact that the rise in pressure is accompanied by cramping and coldness, rather than relaxation and warmth. In inanimate nature and plants, capillarity permits fluids to be raised to great heights, without any special pump being required. The causes of blood transport are etheric energy, buoyancy force, large surface areas and capillarity. We know from embryology that it is the heart that connects the immature vessels to each other and finds out its rhythm from superior impulse sources. The heart is the premier, central organ of rhythm. If illnesses occur in this organic system, the cause is to be found in „inhuman" pleasures in the dietary area, in acting contrary to the daily rhythms, in suppression and neglect of our natural need for movement and creativity, and finally, in the breakdown of our social contacts. Of course, we still have obligations in high-up places at the bank, to some extent, but in our dealings with one another we have very few obligations. The heart is the effector organ of all body fluids. According to anthroposophical thinking, this corresponds to the plant kingdom.

This points us towards prevention and the treatment of cardiovascular disease.

Prophylaxis

Our daily life, the way we deal with stress, our diet and abuse of recreational drugs all determine our tendency to heart disease. Therefore it would be so important for the health of the population if the following points were more carefully observed.

1. *Diet*: As far as possible, food should be of vegetable origin. The fat content should not exceed 10%, and should contain a particularly high proportion of unsaturated fatty acids. These requirements are best satisfied by vegetable oils: rape-seed oil, linseed oil, grape-seed oil, olive oil, and so on. It is especially important that the oils should be cold-pressed. For therapeutic reasons, the consumption of fatty fish-oils is recommended, especially where the triglyceride levels are high. These (e.g. LIPISCOR) are rich in omega-3-fatty acids. As regards cutting down on fats, avoiding animal proteins is generally conducive to

keeping the blood-vessels flexible and the blood pressure and cholesterol levels within the normal range. Vegans do not have heart attacks. Adequate consumption of vegetable supplements (vitamins, flavonoids, chlorophyll and other colourings) along with minerals and energy foods will help the consumer to have healthy blood-vessels and freely flowing blood.

2. *Physical training*: Moderate physical movement in the fresh air to stimulate our senses with relaxed breathing is conducive to good circulation and keeping the body rhythmic. Movement should be loose, light and preferably play-oriented.

3. *Avoidance of stress*: In most cases, acute stress can be processed well, but chronic stress makes people really ill. They get tense and out of rhythm, with all the bad results. So, when stress is unavoidable, it is important to deal quickly with the tasks that have been set and to acquire techniques which can help with relaxation afterwards (yoga, meditation, etc.).

4. *Avoidance of recreational drugs*: Nicotine damages the inner wall of the blood-vessels, causing the blood to clot more rapidly, and results in spasms of the vascular muscles. Cocaine, amphetamines, and coffee too, are conducive to vascular cramps, thrombosis and bleeding from plaques. Therefore, they spell danger for the cardiovascular system.

5. *Cultivate social contacts and tasks*: People who lead a solitary life are at the greatest risk of heart disease. Everything we do for others also benefits ourselves in the end! This is why it is so important to open our hearts to others, to show our emotions and to be sympathetic. Love is the best medicine.

Treatment

1. *Detoxify, de-acidify, get rid of metabolic waste*, by adjusting to a diet which is as free of animal proteins as possible, for then you will automatically avoid animal fats. As far as possible keep your fat consumption below 10% of the total diet. A small weekly bloodletting of 150-200 ml can clearly and rapidly reduce the load borne by the vessels and heart, accompanied by a vegetable diet. Drink enough warm drinks, as these support the liver and kidneys in their eliminative functions (e.g. diluted wormwood tea, yarrow tea, nettle tea, birch-leaf tea, golden rod tea). Alkaline baths for the feet and hands/arms and taking SANUVIS and CITROKEHL to de-acidify and stimulate cell respiration, along with Ubiquinone comp. (from Heel) all act well.

2. *Moderate physical activity*, which does not deviate into stress and can be gradually intensified, to match one's increased capabilities.

3. *Avoidance of ongoing stress* and practice of techniques for relaxation.

4. *Getting involved in groups*, self-help groups, cultivation of social contacts, liberation from isolation.

5. *Isopathic remedies*:
   - MUCOKEHL, to improve the easy flow of the blood, dismantle the blockages in the body and to promote the healing of lesions in the vascular wall.
   - NIGERSAN, to restore the flexibility of the mesenchymal supportive tissue of the vessels and the heart, and to loosen up areas which have become rigid.
   - MUCEDOKEHL, to remove the cardiophobia and cardiac neuroses.

6. *Phytotherapeutics*
   - Whitethorn (Cratægus oxyacanta) and Rose combine the polarities of Venus (sweet relaxation) in the blossoms and fruits, and Mars (ability to put up a fight, and toughness) in the stems and thorns, and have therefore become two of the best-known plant remedies, especially for the heart.
   - St. John's Wort is a plant of the sun, and along with Melissa, it fulfils the task of relaxing, animating and lightening up in heart complaints.
   - Heart ointments containing Lavender, Rose and Gold (the sun metal) may be massaged in on either side of the breastbone and in the præcordial region.
   - Mistletoe (Viscum album), drunk as an infusion, (soak it in cold water in the evening, the next morning strain it and

heat it up) resolves cramps, expands the vessels and stabilises the autonomic nervous system.

- Garlic, 1-3 cloves daily, combats arteriosclerosis and stress in particular, because it makes people keep their distance.
- Avoid the oxidation of LDL with helpings of food containing Vitamin E. Alpha-Tocopherol has a powerful action in reducing high levels of CRP. Doses of Vit. C are beneficial in minimalising the expenditure of Vit. E.
- Olive oil, red wine, genuine liquorice (Glycorrhiza glabra), beside their anti-inflammatory action, also have an inhibiting effect - like root ginger - on the oxidation of the LDL fraction.

7. *Classical Homœopathy:*
Arnica montana, Aurum metallicum, Baryta carbonica, Cactus grandiflorus, Plumbum metallicum and Viscum album can be used to good effect, depending on the symptom picture of the illness.

The best doctors in the world are Dr. Love, Dr. Diet, Dr. Rest and Dr. Cheerful. Their treatment is particularly effective in all diseases of the heart.

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