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What is Health?

We are in the nursery of a big maternity unit in Eastern Europe where several dozen newborn babies are arranged side by side, all of them wrapped in swaddling. Regularly, at a precise time, a nurse wearing a mask conscientiously obeys her orders and goes to fetch one of the little parcels. It is feeding time.

This experience left me feeling that something was wrong. I felt these babies were in danger. I knew that these newborn babies were already beginning to lose that impulse which makes us struggle, struggle for life. This knowledge didn't come to me from reading books, nor from any process of reasoning. It came more directly, from the emotions. And feeling emotions is a way of knowing.

After I came back from my trip in the late 1970s, I couldn't stop thinking about the babies in that nursery. I asked myself what beliefs, what theories, what principles could possibly explain why those babies were separated from their mothers, thus learning that it is useless to cry, useless to ask for anything, useless to express their needs in any way at all. On the face of it, it's done in the name of science. Those babies were entrusted to medicine, which considers itself to be scientific. Science has taught us that germs are dangerous, and has calculated the nutritional needs of babies. So, in the name of science, those babies were protected from family germs, and at

the same time guaranteed the ideal amount of food. Since medicine pretends to be ruled by science and since these days babies belong to medicine, let us then use science to suggest that many babies are in danger.

While I was thinking about these newborn babies, the true significance of some very well-known experiments suddenly dawned on me. These experiments, with dogs or rats, showed how animals can learn to be helpless. During the 1960s, Martin Seligman and his colleagues conducted a series of experiments to test a learning theory. They divided some dogs into two groups. The first group was given electric shocks from which they could do absolutely nothing to escape. The second group of dogs was placed in identical cages, but given no shocks at all.

The same two groups of dogs were then tested in a special box which had two compartments divided by a barrier. In one compartment, the dogs received an electric shock. But by jumping over the barrier, they could escape the shocks. The second group of dogs, which had never had any electric shocks before, very quickly discovered the escape route and jumped over the barrier. But the astounding thing was that the first group of dogs – those which had previously been shocked – did not make any attempt to escape. They just crouched helplessly in the electric shock compartment. Even when the dogs were lifted over the barrier to the safe side, it still made no difference. They had learned from their first experience that nothing they did made any difference, and they were unable to control events. Seligman called this behaviour 'learned helplessness'.

Later, other researchers wanted to find out what physio-

logical changes would occur in rats when they were given varying degrees of control over electric shocks. They found that when the rats had no control over the shocks, they suffered stomach ulcers and weight loss. These rats also had lower levels of adrenalin, the hormone which gives sudden energy to be able to fight, or to run away. The rats were not made ill by the electric shocks, but by the state of submission they were in at the time of the shocks.

In France, Henri Laborit was another scientist who studied the effects of unavoidable electric shocks. What he found was that if a pair of rats were put together in a cage while receiving electric shocks they were protected against a rise in blood pressure by fighting each other. But the rats which could neither fight nor run away did suffer a rise in blood pressure. Laborit coined the phrase 'inhibition of action'. This is both a behavioural and a hormonal response; in particular it affects the secretion of hormones which depress the immune system. This is the system which enables the body to recognize foreign substances and to fight against such invaders as bacteria, viruses, parasites, cancerous cells, and so on.

The implications of all these basic experiments are of paramount importance. They help us to understand just how much a person's entire capabilities are decreased when they have no control over what happens to them, and can only passively submit. They also help us to understand that the responses of the nervous system, the hormonal system and the immune system should never be disassociated. They form a whole.

Thus it was that my first thoughts about life for a newborn baby in a nursery led me to what scientists say about 'sub-

missive behaviour'. In fact, these thoughts could just as well have led me to what they say about the process of attachment between mother and baby, or the importance of sensory stimulation during infancy. No matter, as all these are just different approaches to the same truth. Modern science is moving ahead so fast now that it can even explain, in a variety of ways, that a newborn baby needs its mother!

The example I have chosen of how I felt after visiting that nursery is just one amongst countless others. For every day a doctor's life is enriched by new feelings and sudden *prises de conscience* (*see* Linguistic Note, p. 4). Practising surgery, whether it's war or civilian surgery, you're always confronted with the struggle to survive, or else the recovery of a particular function. You're sometimes confronted with death.

In my own experience, however, it is birth scenes which leave the greatest mark. Being present at the birth of thousands of babies changes you into a different person – as long as the births are not too disturbed by the medical establishment. The holy atmosphere of a birthing room is catching. And to share this holy atmosphere gives you a more global vision. It helps you sort out the essential from matters of secondary importance. When you are in a birthing place, you learn to put aside the analytical functions of the brain. During the period of my life when I was most involved in birth, I noticed that I was better able to ignore certain established ideas. Little by little, I began to look at things in a very personal way. A good example of this is my way of understanding the word 'health'.

Amongst doctors, the word health usually means the absence of disease. As early as the sixteenth century, the

French author Montaigne said that doctors are governed by disease. The mental image associated with the word disease is still not very different from the traditional image of the demon invading the ill person's body; the demon has to be driven out before the sick person can be healed. Disease is something which can be got rid of, rather than something which is part and parcel of the whole person. The idea of health as the absence of disease is based on an old myth which says that each disease has its own cause, and therefore has its own specific treatment. For example, discovering a virus as the cause of a particular disease is a perfect example of this way of looking at things.

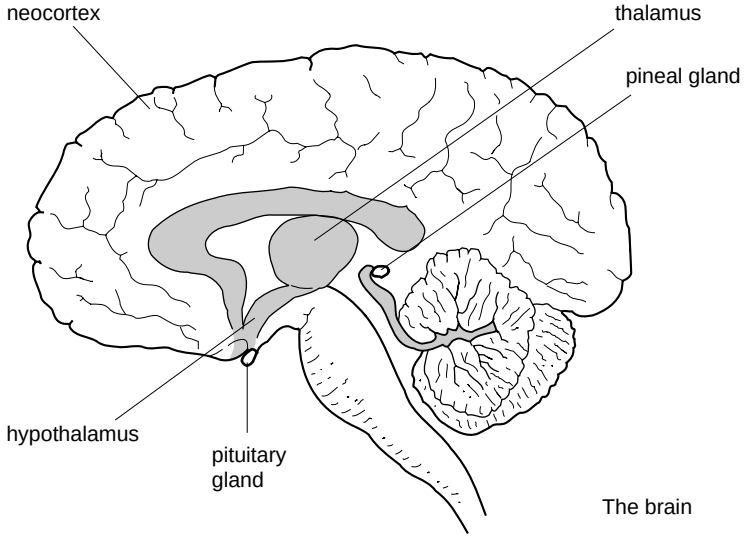
While this mental image is still prevalent in the medical world, other images of health have been gaining ground amongst the general public. As soon as you mention the word health, people think straightaway of good nutrition, exercise, relaxation and lifestyle in general. But this commonly heard association of ideas is actually no more helpful in defining the real nature of good health. Certainly, good nutrition, exercise and positive emotions are good advice to anyone who wants to maintain or cultivate what they already have. But it is impossible to make any radical change in the way our biological computers have been programmed at the primal period of life.

Health cannot really be understood outside the context of the struggle for life. There is no life without struggle. You cannot explain life by the laws of physics alone. Life itself is a constant struggle against one of the fundamental laws of physics: the tendency of energy to become less available to do work with the passing of time – what is commonly called 'entropy'. If you think about any aspect of life, it is impossible

to disassociate it from the concept of struggle. Take, for example, the evolution of the species, and immediately we find the concepts of selection and competition, in other words the concept of struggle.

There is a permanent struggle between different species before an ecological harmony can be reached and maintained. Even within a particular species, sexual rivalry is a way for individual members to strive for survival through their own offspring, by transmitting their own genes. Love, attachment, fellowship within one species, or even between species, may be considered to be a part of a strategy to reinforce the capacity to struggle. Even if we take the most sophisticated aspects of life – human societies – we see that the early theorists of social change soon discovered the importance of class struggles.

What, then, is the place of health among the different aspects of the struggle for life?

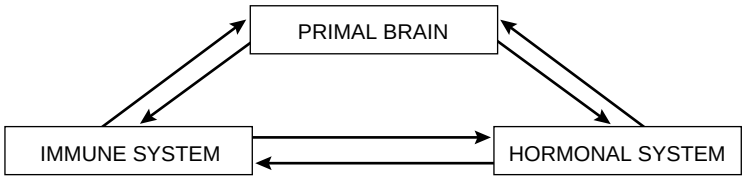


The brain

Health is a system which allows us to struggle on a minute-to-minute basis and to adapt constantly to the environment. This system has an orchestrator. Not to know its name and role is a bit like discussing politics in the USA without knowing about the White House. It belongs to the most archaic, primitive structures of the brain, to that part of the brain which dates back to the ancient history of life. It is the conductor of health in all mammals, and in humans in particular. It is called the hypothalamus.

The role of the hypothalamus as the regulator of hunger, thirst and sexual rhythms has been well known for decades. But it is only recently that its paramount importance has been understood. The hypothalamus has a close relationship with other structures of the brain as well as with the autonomous nervous system. That is why I use the less precise concept of 'primal brain' to cover the hypothalamus and its associated structures (see Glossary, p. 188).

The primal brain controls the hormonal secretions of different endocrine glands. In fact, the brain itself could be considered as a gland since the hypothalamus secretes hormones, and since the nerve cells communicate between themselves by chemical messengers which are not very different from hormones. So any distinction between the primal brain and the hormonal system is now obsolete. In the same way, all traditional divisions between the primal brain and the immune system are also obsolete. There are no divisions. The word health means the way our 'primal adaptive system' works as a whole (see Glossary, p. 188).



The primal adaptive system is a whole

Certain situations trigger a sudden change in the workings of the primal adaptive system. Imagine yourself in two different situations: you have won the pools, or a burglar is threatening you with a gun. It makes no difference whether the feeling is one of joy or fear. Whenever emotions are felt, there is a response by the entire primal adaptive system. So there is a response in the brain, the immune system and the hormonal system, all in unison.

It is during foetal life, the time around birth and infancy that the different parts of this system develop and regulate and adjust themselves. At the end of infancy, the primal adaptive system has reached maturity. I call primal health the balancing of the set point levels (see Glossary, p. 190) which have been reached by the end of infancy. To understand what set point levels mean, think of a central heating thermostat. You set the thermostat to a particular temperature at the beginning of the day, and the heating reaches the temperature you have set. It is similar with our hormonal levels, which have to be set at the beginning of life and which continue to 'switch on' at the set level. Thus, primal health is built at that time when the baby is closely dependent on its mother, first in the womb, then during childbirth, and then during the period of breastfeeding. Everything which happens during this period of depen-

dence on the mother has an influence on this basic state of health, this primal health.

There are many things which lead me to believe that the way I perceive health is radically different from the usual concept. In today's society, connections between the primal period and adulthood are uncommon, and not just where health is concerned. For instance, I read a long biography of Jean-Jacques Rousseau in which the author had completely overlooked the fact that he had lost his mother at the age of ten days! When people do attempt to make these connections, it is only because they are interested in sensory functions. They might ask questions like: what can a baby perceive in the womb? Or, what can a newborn baby see? But obviously they are more interested in learning capabilities than in health as a whole.

It seems to be not yet well understood that a sensory function at the beginning of life can be a means of stimulating the primal brain at a time when the primal adaptive system has not yet reached full maturity. In simple terms it means that when, for example, you caress a human baby or the young of any animal you are also stimulating its immune system. The knowledge of the universe which we have through our sensory organs takes us on to another aspect of the struggle for life, which is outside the field of health.

The mental imagery commonly associated with the word health is in itself dangerous and life-destroying. The concept of primal health might make it easier to shift our priorities and to rediscover the fundamental needs which a human being has at the beginning of his life. My understanding of the word health might have huge practical consequences. After all, to a great extent the world is governed by words.

2

The Primal Adaptive System

The new-boy syndrome at college is universally known. During the first weeks, newcomers share a particular emotional state. According to serious scientific and medical literature, new students have a high level of cortisol and their immune system is disturbed at the start of their first year. Similarly, studies of groups of men have shown them to have a very specific hormonal state and depressed immune systems six weeks after the death of their spouse. It is something totally new to be able to say that a particular emotional state is always associated with both a specific hormonal state and with a reaction in the immune system.

The deeper I go into the spectacular breakthroughs of the biological sciences, the more my views are reinforced. If all this new data were to be incorporated, it would help us reach a new vision of life, particularly of the human phenomenon. But dividing the different disciplines, and putting them into separate compartments, makes this synthesis difficult. For example, I know a recent book about immunology in which you cannot find the word hypothalamus! I have also noticed that the immune system does not get so much as a mention in certain recent well-known books on the brain and nervous system.

So the first thing we have to do is to smash the barriers

between these disciplines. They get in the way. We have to show that the barriers are artificial, and get us nowhere. Smashing barriers is an essential first step before the word health can be truly understood, and before defining the primal adaptive system. I also want to show that the different parts of this system mature very early in life, at the time when the baby is dependent on the mother. In this respect, the primal adaptive system is totally different from the 'new brain' or neocortex, which can increase its capacity until a very advanced age if it is stimulated enough (see p. 27).

The Immune System — A Reminder

First of all, everyone interested in health should keep in mind some basic facts about what we call the immune system. It plays a key role in many modern diseases, as for example in the mysterious Aids — Acquired Immune Deficiency Syndrome — about which the news media have stirred up a lot of fear and curiosity. For anyone not familiar with the biological sciences, there follow some key words which should help explain how the immune system works. This reminder about the immune system will also give me a chance to break through another barrier — the barrier of language. It will also reinforce the idea that life is a constant struggle between ourselves and the environment.

To make the immune system easier to understand, I shall play toy soldiers and use military language. The immune system is the body's defence system, the means by which it fights off potentially dangerous foreign organisms such as

bacteria. From the moment we are born, we live among bacteria. We need bacteria. But in some circumstances certain bacteria can be dangerous and must be fought off. The first line of defence is the *frontier*, such as the skin or the mucous membrane, which bacteria cannot easily get through. If an entry gate is open, such as a small wound, *the frontier guards* will organize *local resistance*, no matter who the invaders are. This is called inflammation. *The local battleground* is red, hot and painful because more blood reaches the area. Mobile white blood cells called phagocytes arrive on the scene as reinforcements and join in the local fight, encircling the bacteria and destroying them. The usual outcome is a rapid and complete victory for the defending army. Sometimes, however, victory is only possible with the formation of pus, which means the destruction of many white cells and phagocytes. In some cases, the local defence is overcome and the battle moves to the lymphatic nodes or to organs such as the liver, spleen or lungs. If there is a repeated penetration of bacteria into the bloodstream, it is called septicaemia. Total *defeat* of the body's defences is possible. Resistance to invaders can be reinforced by an acquired immunity. The immune system can learn: it has a memory. It has to learn how to fight specific enemies by using billions of different types of antibodies. These antibodies *patrol* and protect the body and are made from a white cell called 'B lymphocyte'. This kind of immunity, which is useful in the confrontation with invaders, is connected with another sort of immunity which involves the 'T lymphocytes'. While antibodies might be compared to *bullets*, T lymphocytes are more like *soldiers*. Lymphocytes are specialized. T-killers undertake *reconnaissance* and the selective destruction of

specific *targets*. There are also T-helpers, which help B lymphocytes to secrete antibodies, and T-suppressors, which moderate the secretion of antibodies. Depending on the ratio between these two kinds of T cells, the production of antibodies of the B cells is either stimulated or suppressed.

This army is able to renew itself continually. In just a matter of minutes, millions of new lymphocytes and billions of new antibodies are produced. Lymphocytes are made from specialized cells in the bone marrow, which is like a sort of *basic training ground*. The lymphocytes move on to the thymus (see Glossary, p. 190) which is more like a *specialized training camp*. It is here that the lymphocytes realize their particular competence, and it is from the thymus that they get their name – 'T' lymphocytes. The thymus is a small gland situated immediately behind the top of the chest bone. For a long time it was known only to gastronomes. It is 'sweetbreads'. Its physiological function has always been mysterious. Relatively large at birth, its size increases during childhood, then gets much smaller after puberty. In old people it is a vestige of its former self. Only in recent years has the thymus been considered to be an essential organ in the immune system. Of course, other organs, such as the lymphatic nodes, also play an important role in immunity.

Even though the immune system is dispersed, nevertheless it has a unity within it. It is like a national defence which coordinates the action of all the armed forces. Apart from combating bacteria, the immune system is at war with invaders as diverse as viruses, parasites, fungus spores or cancer cells. Of course, the immune system can make mistakes; it can hit the wrong target, or even turn the guns on itself in which

case the antibodies destroy the cells they should be protecting. That is what is meant by 'auto-immune disease'. The immune system can also overreact to foreigners who are not really dangerous. This is what is meant by allergy. The immune system uses only a small part of the energy it has at its disposal. Put another way, the budget of the immune defences is small compared, for example, with the budget of the motor muscles.

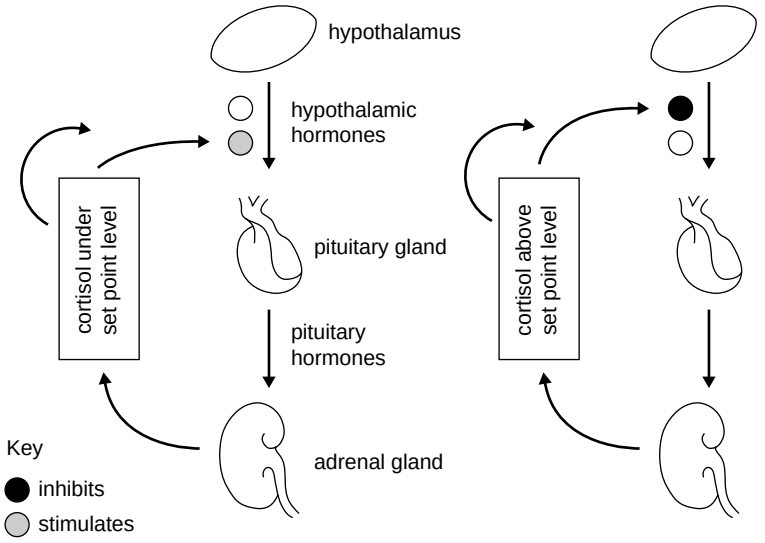
Immunologists have to be convinced of the truth that life is a struggle and that struggling is a need. The immune system learns how to fight by fighting. But if the immune system does not get the chance to fight off certain viruses which usually attack in childhood, then it is a much more difficult and exhausting battle as an adult. So it is better to get mumps at the age of four, rather than thirty-four.

Barriers which Get in the Way

The easiest barrier to smash between the various parts of the primal adaptive system is the one placed between the primal brain and the hormonal system. The hypothalamus belongs to the brain. It is made of nerve cells which communicate with other nerve cells by direct contact with their extended fibres. But the hypothalamus also belongs to the hormonal system. It secrets hormones on its own. These hormones reach the pituitary gland through the bloodstream. The hormones from the hypothalamus can either stimulate or inhibit the release of pituitary secretions.

The pituitary hormones in turn stimulate other endocrine

A feedback mechanism, showing the relationship between the hypothalamus, pituitary gland and the adrenal gland



glands such as the adrenal glands, thyroid, ovaries and testicles. All these hormonal secretions (in the diagram cortisol is used as the model, but oestrogen, progesterone and testosterone are other examples) control the activity of the hypothalamus by means of a feedback mechanism. Thus there is a real interdependence between the endocrine glands and the brain. What is more, the brain itself can now be considered as a gland with two exit doors: one which gives orders to the muscles and internal organs of the body through the nerve cells, and the other which gives orders to the whole organism through the hypothalamic hormones.

The brain can use the hormonal route, that is to say, chemical messengers, to send information from one part of itself to another. Nerve cells do not need to touch each other to

communicate. For example, thirst can be triggered by injecting a small amount of a hormone called angiotensin into a precise zone of the brain; maternal behaviour can be induced in the same way by injecting some pituitary oxytocin. This phenomenon helps us to understand how small brain grafts can compensate for certain deficits. Physiologists and doctors who have a mental picture of cell-to-cell transmission, like an electronic network, might find it difficult to acknowledge the existence of certain substances that can modify the activity of the brain by a mechanism which is similar to the tuning of an orchestra.

A tougher barrier to smash is that which traditionally divides the hormonal system from the immune system. A few examples are enough to show that they are both part of a whole. Cortisol, the hormone secreted by the adrenal gland in situations of helplessness and hopelessness, depresses the immune system. It reduces the size of the thymus. It reduces the number and inhibits the activity of the T cells. It inhibits the synthesis of proteins in general and of antibodies in particular. In fact, the thymus itself is an endocrine gland which can secrete different kinds of thymosine. These thymosines take part in controlling the secretion of different kinds of stress hormones by the feedback mechanism.

It is not only cortisol which plays a role in all immune reactions. All the stress hormones do. Noradrenalin binds itself to surface receptors of lymphocytes and of other white cells and normally inhibits their function. Endorphins, which are natural pain-killers secreted by the primal brain, also influence the activity of the immune system.

In fact, every kind of hormonal secretion plays a role in

immunity – not just the stress hormones. For example, the growth hormone is needed to maintain or restore the functions of T lymphocytes. The fusion between the hormonal system and the immune system is even more obvious since we know that lymphocytes themselves can produce ACTH, the hormone which stimulates the adrenal gland, and can also produce endorphins. We also know that lymphocytes have surface receptors for a wide variety of hormones. Of course, there are still many questions to which we don't yet know the answers. Even so, any kind of distinction between the hormonal system and the immune system can now be said to be obsolete.

What is perhaps even more difficult for many scientists and doctors is to fuse together their mental pictures of the primal brain and the immune system. For that reason it may be helpful to mention some research findings, some old, some new.

For many years it has been well known that there are nerve endings in the different organs of the immune system (thymus, bone marrow, spleen, lymphatic nodes). Certain lesions and certain stimuli of nerves are also known to have important effects on the number and activity of cells in these organs. Also, we now know that stimulating the immune system sends a flow of information to the hypothalamus. Some antigens – that is, substances which stimulate the immune system – can considerably increase the electrical activity of certain nerve cells of the hypothalamus. So the immune system can now be seen as an actual sensory organ which gives information to the brain.

Some spectacular experiments on the conditioning of

immune reactions allow us to predict that the marriage between the nervous system and the immune system will be a thrilling new topic. Such a theoretical breakthrough might have enormous practical consequences. The American scientist Ader did an experiment on animals using taste aversion. He gave them saccharinated water at the same time as injections of a drug which depressed the immune system and which triggered digestive troubles. He then found that he could depress the immune system of these animals by giving them saccharinated water alone. Although Pavlov had already foreseen the possibility of conditioning the immune system, and although Metalnikov had shown during the 1920s at the Pasteur Institute in Paris that conditioning can change the response of an organism to an infectious agent, no one would have attempted to talk about educating the immune system even fifteen years ago.

Modern science is able to point not only to the unity of the primal adaptive system, but also to the incessant circulation of information inside this infinitely complex network. Modern science considers this circulation of information as a form of energy. Indeed, the primal adaptive system has a lot in common with traditional oriental theories about the circulation of energy.

Just as traditional oriental medicine thinks of disease as a disturbance of the channels of energy, so we can interpret disease as a disturbance of the primal adaptive system. After a great many detours, Western science will soon discover that Eastern traditions have passed on a profound understanding of human beings and of health.

Eastern traditions also understood the importance of foetal

life and infancy. They knew this period formed the foundation on which the rest of a person's life was built. In ancient China, they used to practise 'embryonic education' (Tai-Kyo), the basic principle of which is that only a happy and healthy mother can have a happy and healthy baby. There are many proverbs inspired by the teachings of Tai-Kyo. For example: 'If you want to know a person, look at his mother.' In the *Caraka Samhita*, an Indian tradition, the development of the embryo and the foetus is studied during the third and fourth week of pregnancy, then month by month up to the seventh month. There are long chapters about fertility, conception, pregnancy and the newborn baby. In the Tibetan tradition *r Gyud-b Shi* the foetus is studied week by week.

Early Development of the Primal Adaptive System

Thanks to recent scientific research, it is now possible for us to see the primal adaptive system as one whole. We also know that this system develops and reaches maturity during the time of close dependence on the mother.

When modern science talks about 'the archaic brain' or 'the primitive structures of the brain' it means the oldest part of the brain, both in the history of life and in the history of each human being. The primal brain is roughly the same among all mammals, from the most primitive right up to man. The primal brain reaches its maturity very early in the life of a human being, in the period of foetal life, birth and infancy. So the information going to the brain during this crucial period affects the course of some very important stages of its development.