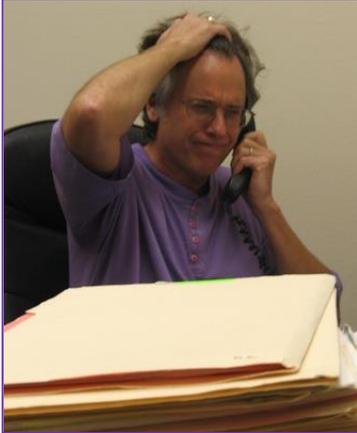


## WHAT IS STRESS?



Hans Selye, a Canadian endocrinologist and the pioneer of stress research began his work in the late 1930's. He coined the term **stress** and defined it as ***the non specific response of the body to any demand (stressor), whether it is caused by or results in pleasant or unpleasant conditions.*** The stressor can be physical, mental or emotional. The stressor can be real or imaginary. Dr. Selye emphasized the non-specific nature of stress which is a natural part of life and cannot be avoided. Stress is needed for the growth of the organism. Adaptation is required for survival.

Talbott (2007) concludes that our bodies were simply not designed to endure the unique stress we face in the 21<sup>st</sup> Century. He describes chronically stressed individuals as being in a perpetual state of hurry, having twenty-five hours of stuff to do in a twenty-four-hour day. They are depressed, fatigued, and have a low sex drive. They have trouble concentrating and a lot of abdominal fat (pp.10--11). These individuals may be quite typical in our culture today. The lifestyle that promotes these characteristics is not normal or healthy. The impact of our modern high tech fast paced lifestyle on health is devastating.

Ancient wisdom shows us another way of living that allows us to change our lives by first changing our consciousness. We (modern people) have collectively created our stressful lifestyle. Our bodies (and the planet) cannot endure the stress being placed upon it by our addiction to energy, comfort, and material possessions. We have the ability to adapt to the restrictions now being placed upon us. We must begin to make healthy choices everyday – for ourselves and our planet. I believe we must rediscover ancient truths and return to a simpler way of life. In the process I believe we will experience deep peace and joy which is our birthright.

## THE STRESS RESPONSE

The stress response, or fight or flight mechanism, is a primitive physiological response to a physical threat. Skye (1998) presents a creative illustration of this mechanism with the following story:

Once upon a time, you walked along a jungle track. You suddenly stopped, absolutely still, and your nostrils flared as you sniffed the air. You were aware of your heart pounding loudly beneath your ribcage as you strained to hear the faintest sound.

On a branch above you, a jaguar crouched, also absolutely still, save for a slight twitch of the tip of its tail. Slowly, soundlessly, you moved your head slightly so that you could see, with your peripheral vision, the outline of

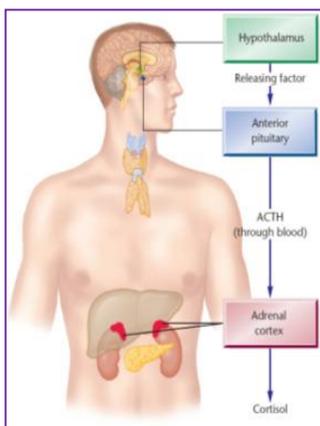
the predator along the slim branch. Your grip tightened on your spear; your mouth was very dry.

To an onlooker, there was an explosion as the big cat launched itself; but to you, everything seemed to happen very slowly. You jumped aside and thrust upward with your spear – its fire-hardened tip entered the jaguar’s belly and sunk deep. The spear was wrenched from your hands as the cat hit the ground and rolled, snarling, to one side. The shaft snapped and fell into the brush as the cat rolled and then stood looking briefly at you before launching itself at your face.

Instead of standing your ground and waiting to be hit – for you were a skilled warrior – you moved in and to the side, hardly noticing your shoulder sliced by the razor-sharp claws as the cat flailed in mid-air, misjudging its leap.

Even before the big cat hit the ground, you jumped on its back, encircled its throat from behind and with a mighty wrenching heave, brought your clasped hand and forearm snapping back. The sound of the neck breaking seemed to go deep inside you...and then you stood up, legs and arms trembling, chest heaving as you sucked in huge gusts of air and looked down at the dead jaguar beneath you. You reached out your arms, threw your head back and roared a scream of triumph that echoed through the jungle. Brightly colored birds rose briefly in a noisy flurry from the tops of the trees, and then all was again silent.

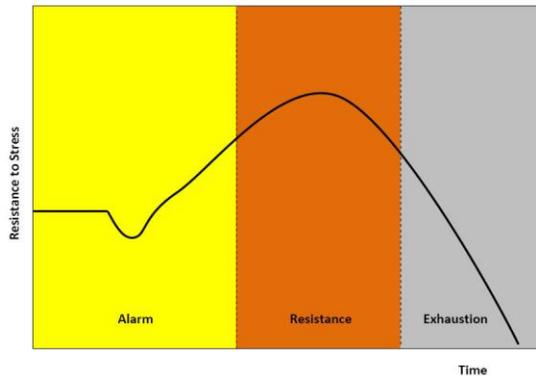
You sank into the soft green jungle floor and lay there for some time. Slowly you became aware of the myriad sounds of life, large and small around you. You became aware also of the pain in your shoulder and the warm stickiness of the blood. You tried to move your arm and found it difficult – painful – and wondered at how the strength had poured into your muscles. (pp. 9-10)



The brain, the nervous system, and the endocrine system work together to orchestrate a complex cascade of processes known as the **stress response, or fight or flight**. Resources are mobilized which allow us to protect ourselves from physical danger. The brain receives information from our senses (taste, touch, smell, sight, sound). When the brain perceives a stressor, the hypothalamus and pituitary glands (two endocrine organs that are part of the brain) work together to signal the adrenal glands (endocrine organs located on the top of each kidney) to release adrenaline and cortisol (stress hormones) into the blood stream. The brain is directly

connected to the heart by the sympathetic nervous system which stimulates the heart to beat faster and stronger, and can cause the coronary arteries to constrict.

## THE GENERAL ADAPTATION SYNDROME



Dr. Selye claimed that the organism undergoes a generalized physiological response in its efforts to adapt to the demands and pressures it experiences, whatever they might be. He called this the General Adaptation Syndrome.

ALARM is the first stage. The stressor is identified or realized. The stress response is initiated. Adrenaline floods the bloodstream, and the stress response is

activated.

RESISTANCE becomes necessary if the stressor persists. The body attempts to adapt as it uses all available resources. Cortisol works to mobilize energy stores to keep up with the body's demand.

EXHAUSTION is the final stage in this model. Bodily resources are depleted, physiological functions are impaired, and illness (physical or emotional) or death may occur.

## ACUTE VERSES CHRONIC STRESS

The story about the jaguar and the warrior is an excellent example of acute stress. Even in our modern world, we are at times faced with acute stress. It may be physical – moving quickly to rescue a child from harm's way, or emotional – an unusually difficult confrontation at work. In the case of physical stress, fighting off the stressor, or running away from it utilizes the chemicals that come into play during the acute stress response. We overcome the stressor, and we are able to then relax. In cases of emotional stress, if we recognize what is happening to us, we can trick our body into believing that we are fighting or fleeing in response to the stressor by going for a brisk walk or exerting ourselves physically. This naturally utilizes the chemicals in our blood stream. We can then relax as our body returns to normal.

Ornish (1996) describes the physiological changes that occur in the body when adrenaline – the chemical mediator of acute stress – is released into the blood stream (pp. 69--70):

- Our muscles begin to contract, thereby fortifying our "body armor". We are more protected from bodily injury.
- Our metabolism speeds up, providing more strength and energy with which to fight or run. Both our heart rate and the amount of blood pumped with each beat increase.

- Our rate of breathing begins to increase, providing more oxygen to do battle or to run from danger.
- Our digestive system begins to shut down, diverting more blood and energy to the large muscles needed to fight or run.
- The pupils of our eyes begin to dilate, aiding vision. Other senses such as hearing also become heightened.
- We feel an urge to urinate and move the bowels, to reduce the danger of infection if abdominal injury should occur.
- Arteries in our arms and legs begin to constrict, so that less blood will be lost if we become wounded or injured.
- Our blood clots more quickly, so we'll lose less blood if we become wounded or injured.

As you can see, the wisdom of the body is absolutely amazing. All of these protective mechanisms shift into gear immediately and automatically when we are in danger! This is the ALARM phase of the General Adaptation syndrome. We then resist the stressor, and we are able to recover without being pushed to the point of exhaustion.

The problem is that in modern society, stressors are not usually well defined, self limiting or physical in nature. We experience stressors all around us – environmental stressors in the food we eat, the water we drink, and the air that we breathe. Socioeconomic stress happens when we worry about money, the effects of the mortgage crisis, unemployment, the cost of gas and the failing health care system. We experience job stress, relationship stress. Stress, stress, stress!

Stress is now chronic and endemic in our society. Our bodies are beyond the alarm phase, and we are trying to resist, but we are not able to overcome the stressors. Now we need cortisol, the master stress hormone. It is needed to maintain physiological processes as the body sustains the effort to resist stressors. Cortisol levels normally fluctuate during a twenty four hour period in response to the body's physiological needs. But now, it seems that we need the effect of cortisol 24/7!

#### CORTISOL, TESTOSTERONE AND CHRONIC ILLNESS

With continued stress, cortisol production is increased in order to fuel the body's sustained resistance against the perceived threat. When cortisol is sustained in the blood stream at high levels, destructive changes in the body occur.

Blood sugar, or glucose, is the main source of energy for the body and the brain. When exposed to chronic stress, the body's need for glucose exceeds the supply. The body attempts to meet this demand. With the help of cortisol, muscle and fat tissue is broken down and transformed into a new glucose supply. Fatty acids released in this process reduce the ability of the cell to utilize insulin. (Insulin is a hormone which is required to carry the glucose molecule from the blood stream into the cell where it is able to provide

nourishment). This process ensures a ready supply of sugar in the blood stream. When stress is chronic, blood sugar levels remain elevated and the body is subject all of the pathological changes that occur with Diabetes Mellitus.

Cortisol regulates the body's immune response preventing it from getting out of control. The immune system is responsible for fighting infection or anything the body perceives as an invader. The immune response is a protective mechanism and becomes active during times of stress. These effects of cortisol on the immune system are called immunosuppressive and anti-inflammatory. Continued release of cortisol can significantly reduce the body's ability to fight off invaders and infection. Cortisol is important in controlling mood and well-being, immune cells and inflammation, blood vessels and blood pressure, and in the maintenance of connective tissues such as bones, muscles and skin.

Talbott (2007) explains that cortisol in the body has an inverse relationship with another important hormone – testosterone. When cortisol levels increase, testosterone levels decrease. This is because the human body is not capable of protection and procreation at the same time. It must choose one mode of operation or the other. Testosterone is known as the male sex hormone, but it is vitally important in both men and women. It is needed to build (and repair) muscle, skin, tendons, bones, immune-system components, and to control blood cell production and metabolism of food. Low testosterone levels in both men and women can lead to the following health problems ( pp. 65--66):

- Emotional changes (increased anxiety and depression)
- Low sex drive
- Decreased muscle mass
- Reduced metabolic rate
- Increased abdominal fat
- Weak bones
- Back pain
- Elevated cholesterol

Talbott (2007) explains that chronically elevated cortisol levels and decreased testosterone levels are associated with obesity, high blood pressure, diabetes, fatigue, depression, moodiness, irregular menstrual periods, decreased sex drive and Alzheimer's disease. Too much cortisol over a long period of time can lead to muscle loss, bone loss (osteopenia and osteoporosis), immune system suppression and brain shrinkage. The initial stimulatory effect of cortisol can lead to allergies, asthma, rheumatoid arthritis, lupus and fibromyalgia (pp. 46--47).

## WHAT THE ANCIENTS KNEW

Yoga is an ancient way of life that has been around for thousands of years. The origins of yoga are to be found in ancient India. Yoga is a living art and science which continues to evolve today. Yoga does not set forth dogma, but rather leads the student to find the essential goodness that dwells within each of us. Yoga helps us to reconnect the mind with the body. Yoga helps us to restore balance in our bodies and in our lives.

The ancient yogis experimented in the laboratory called life. They learned how to quiet the mind and to regulate physiological processes which most modern people believe to be beyond the control of the conscious mind. Scientific research reveals that yoga practice reduces the impact of stress and promotes wellness.

## HEALTH BENEFITS OF YOGA

Timothy McCall, M.D., conducted a comprehensive review of research that investigated the therapeutic benefit of yoga, and provides the following list of ways that yoga heals:

1. Increases flexibility
2. Strengthens muscles
3. Improves balance
4. Improves immune function
5. Improves posture
6. Improves lung function
7. Leads to slower and deeper breathing
8. Discourages mouth breathing
9. Increases oxygenation of tissues
10. Improves joint health
11. Nourishes intervertebral discs
12. Improves return of venous blood
13. Increases circulation of lymph
14. Improves function of the feet
15. Improves proprioception
16. Increases control of bodily functions
17. Strengthens bones
18. Conditions the cardiovascular system
19. Promotes weight loss
20. Relaxes the nervous system
21. Improves the function of the nervous system
22. Improves brain function
23. Activates the left prefrontal cortex
24. Changes neurotransmitter levels
25. Lowers levels of the stress hormone cortisol
26. Lowers blood sugar
27. Lowers blood pressure
28. Improves levels of cholesterol and triglycerides

29. Thins the blood
30. Improves bowel function
31. Releases unconscious muscular gripping
32. Uses imagery to effect change in the body
33. Relieves pain
34. Lowers need for medication
35. Fosters healing relationships
36. Improves psychological health
37. Leads to healthier habits
38. Fosters spiritual growth
39. Elicits the placebo effect
40. Encourages involvement in your own healing

The practice of yoga includes not only physical exercises, but also a rule of life, breathing exercises, meditation, relaxation and recommendations for a healthy diet. A qualified teacher can help you to find the practices that appropriate for you. Once you learn the basics, you can practice anywhere and anytime. All you need is your body, your breath, and your concentration. Yoga will lead to improved physical health, greater efficiency in your daily life, and enhanced enjoyment of all aspects of your life.

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