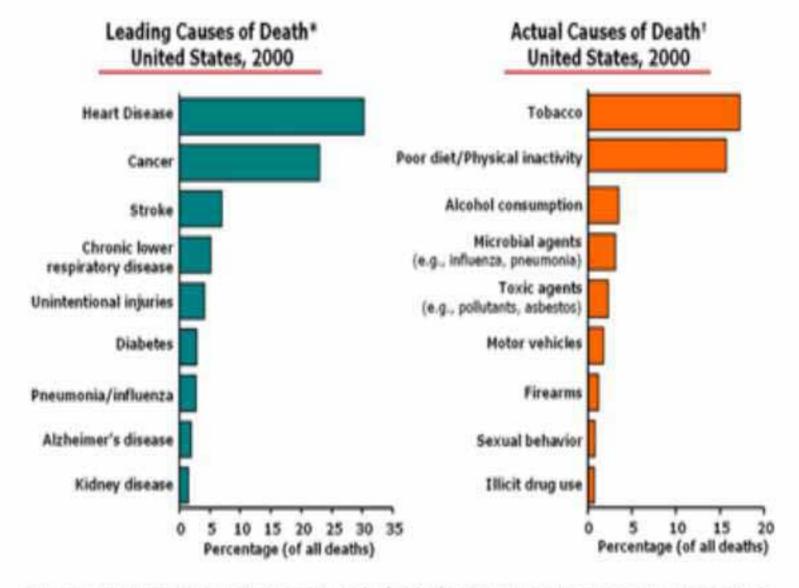




Even with improved standards of living in the developed world we are more susceptible to stress, anxiety and depression than at any time in our history?

The American Medical Association estimates around 75% of human illnesses are contributed to by stress-related conditions



<sup>\*</sup> Minifo AM, Arias E, Kochanek KD, Murphy SL, Smith BL. Deaths: final data for 2000. National Vital Statistics Reports 2002; 50(15):1-120.

<sup>†</sup> Molidad AH, Marks JS, Stroup DF, Gerberding X. Actual causes of death in the Linited States, 2000. JAMA. 2004;291(10):1236-1246.

The American Medical Association estimates around 75% of human illnesses are contributed to by stress-related conditions

Suffering and death through depression-related disorders is

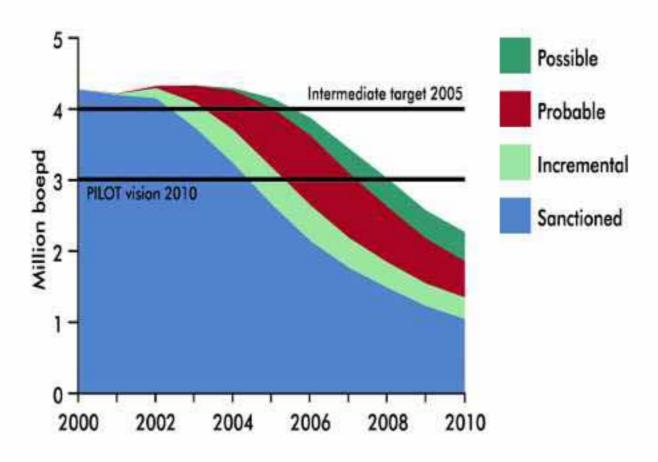
second only to cardiovascular diseases

They contribute significantly to rates of alcoholism, obesity and drug addiction



#### **Economic costs**

The economic costs of stress, anxiety and depression disorders extend beyond healthcare and have a major commercial impact

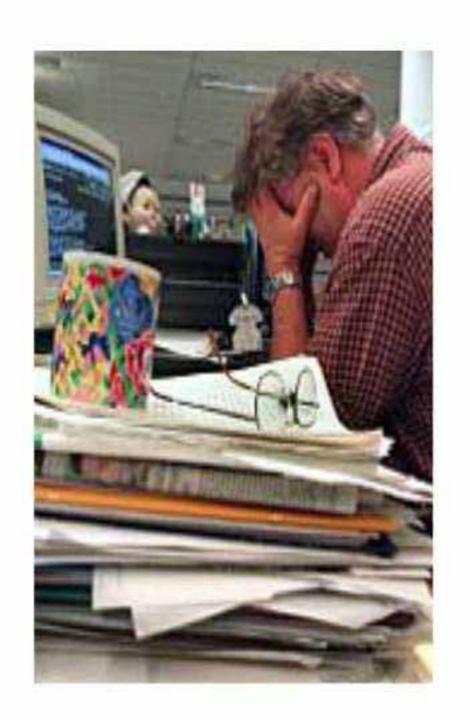


#### **Economic costs**

A UK survey in November 2000 estimated that 6.7 million working days are lost each year at a cost of around £3.7bn

The problem is increasing with a survey in 2001/2 reporting 1 in 5 workers considered their jobs were very or extremely stressful

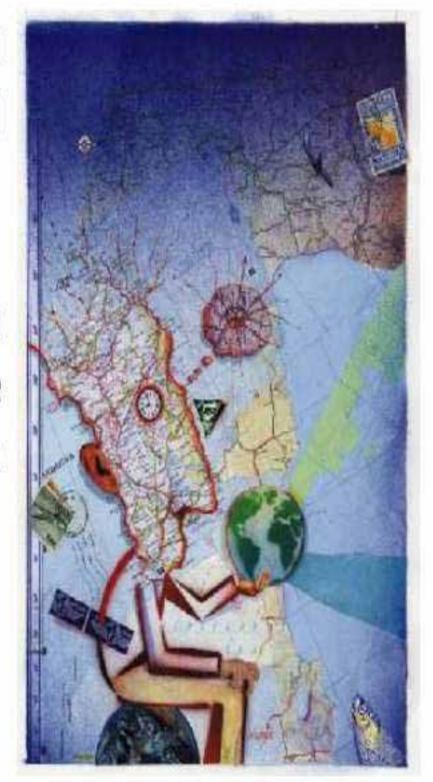
Half a million new individuals per year report that work-related stress is making them ill



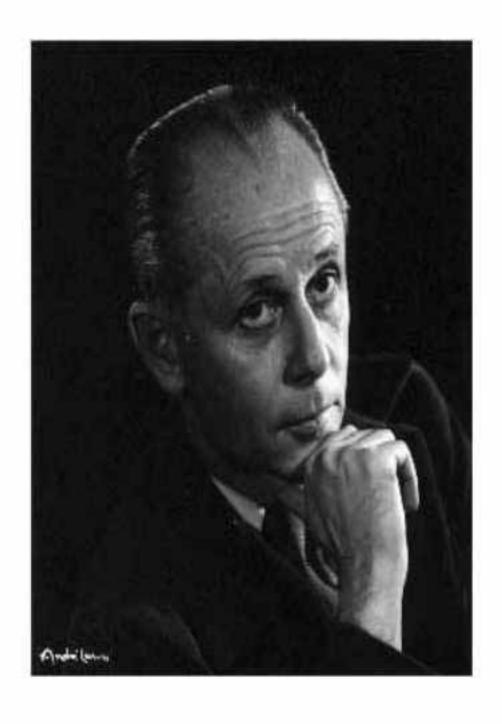
#### Questions

Are we facing a stress, anxiety and depression pandemic in the developed world?

Are humans failing to cope with life in a material world, divorced from the immediate concerns of reproduction and survival ?



'Everybody knows what stress is and nobody knows what it is' Hans Selye (1973)



'Everybody knows what stress is and nobody knows what it is' Hans Selye (1973)

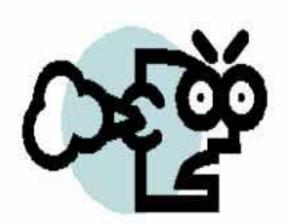
Acute symptoms: feeling alert – increased muscle tension – dry mouth – cold skin – sweaty palms – increased heart and breathing rate – feeling nauseous

'Everybody knows what stress is and nobody knows what it is' Hans Selye (1973)

Acute symptoms: feeling alert – increased muscle tension – dry mouth – cold skin – sweaty palms – increased heart and breathing rate – feeling nauseous

If prolonged – feeling tired - moody – irritable – frequent headaches - run down – problems sleeping – problems with appetite and digestion - prone to minor illnesses





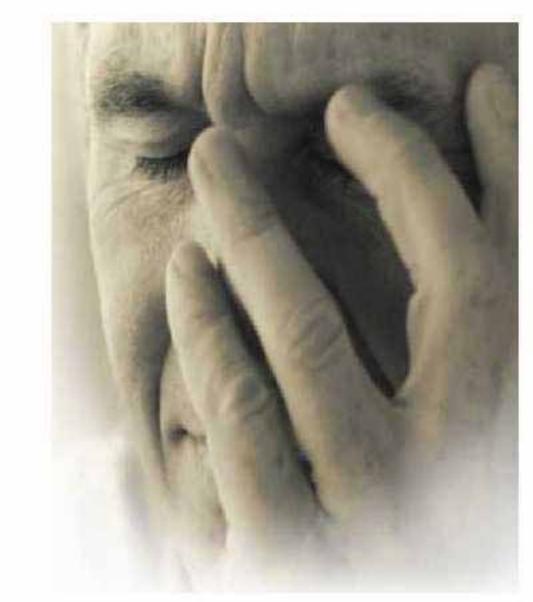
#### Stress is:

In engineering - a force that exerts a physical strain on a

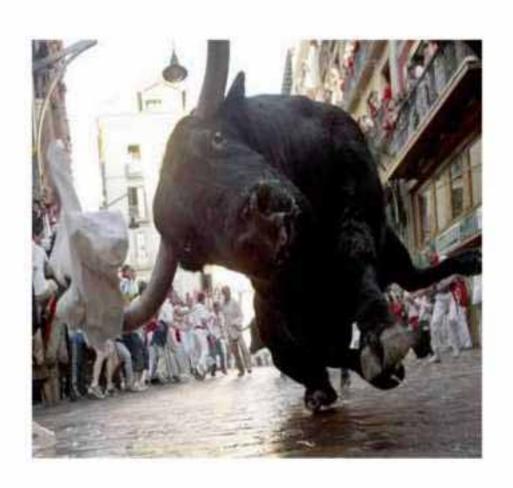
structure

'A syndrome produced by diverse nocuous agents' Hans Selye (1936)

A condition in which an individual is aroused by an aversive situation

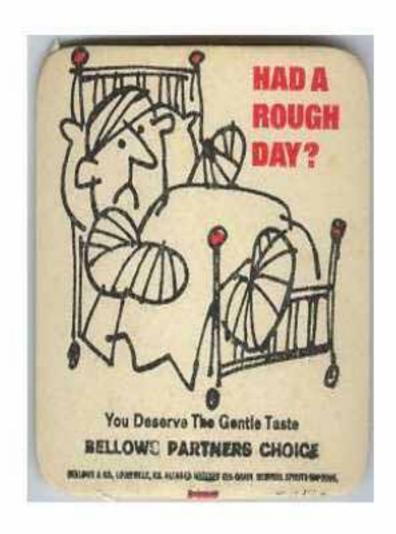


Stress prepares us for action so that we can face up to a problem more effectively or avoid it – 'fight or flight'



A stressor is whatever external challenge (force) that provokes a stress response:

Physical – injury, extreme temperature, lack of oxygen



A stressor is whatever external challenge (force) that provokes a stress response:

Physical – injury, extreme temperature, lack of oxygen

Psychological – losing a loved one, social isolation, rejection, being subjected to criticism or anger, being expected to carry out impossible tasks



#### Anxiety is:

An emotional mood state that promotes stress as a result of inability to predict the outcome of, or cope with, different situations or thoughts



Anxiety can also be an anticipatory response to help us deal with immediate or imminent challenges



Anxiety can also be an anticipatory response to help us deal with immediate or imminent challenges

Strong cognitive element

anxiety responses can be disproportional to situation

Does not have to be triggered by a perceived stressor

- thoughts or post-trauma spontaneous episodes of anxiety

Individuals prone to anxiety often tend to show greater general stress responses

Pathological forms of anxiety:

generalized anxiety disorder – unrealistic, excessive worry, tension and rigidity of movement, restlessness, irritability, difficulty sleeping, hypervigilance

social phobia – aversion, fear and autonomic arousal in unfamiliar social settings

specific phobia - aversion, fear and autonomic arousal in specific situations (spiders, snakes, blood etc)

Pathological forms of anxiety:

panic disorder - recurrent, unexpected episodes of terror which trigger a generalised stress response, shortness or breath, fear of dying and losing control and de-realization

post-traumatic stress disorder – following an extremely stressful event involving actual or threatened injury recurrent episodes of fear are often triggered by reminders of the trauma and individuals show autonomic arousal

Pathological forms of anxiety:

obsessive-compulsive disorder – recurrent obsessions and compulsions: persistent intrusive thoughts that cause anxiety and lead to performing repetitive acts to alleviate the anxiety

Pathological forms of anxiety:

Experienced by 1 in 5 individuals at some time during their lives in countries in the developed world



Pathological forms of anxiety:

Experienced by 1 in 5 individuals at some time during their lives in countries in the developed world

In the USA the economic cost is estimated to be \$44 billion per annum

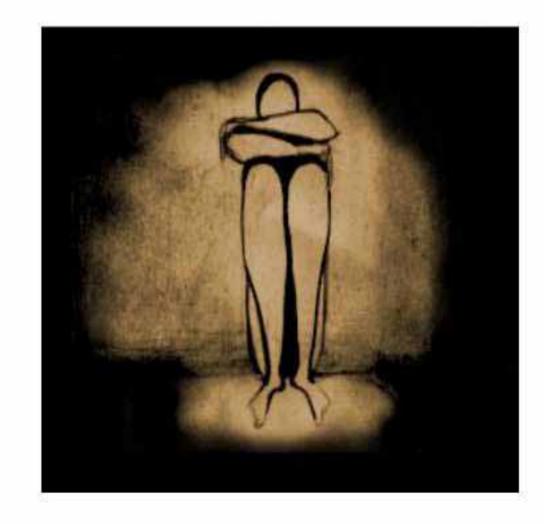


#### Depression is:

An emotional mood state promoted by the stress and anxiety caused by failure to achieve our expected goals in

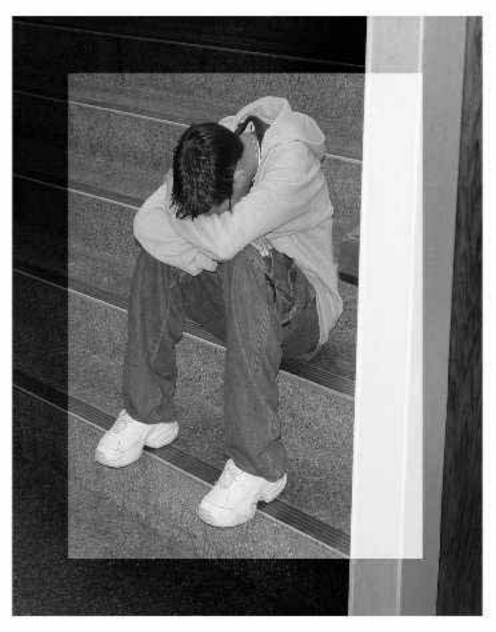
either social or other situations

A pattern of behaviour where we deliberately avoid re-exposing ourselves to challenging situations, and become obsessed with our shortcomings and self-blame



# Major depression

Mood is suddenly and severely depressed for more than 2 weeks



#### Major depression - symptoms:

Persistent sad, anxious, or 'empty' mood nearly every day (observation made by others = tearful), hopelessness, pessimism etc

Rarely feel pleasure or joy during activities that were once enjoyed, including sex

Feelings of guilt, worthlessness, helplessness

Decreased energy, fatigue, being 'slowed down'



#### Major depression - symptoms:

Difficulty concentrating, remembering, making decisions

Insomnia, early-morning awakening, or oversleeping (hypersomnia)

Appetite and/or weight loss or overeating and weight gain

Thoughts of death or suicide; suicide attempts

Restlessness, irritability



#### Major depression - symptoms:

Persistent physical symptoms that do not respond to treatment, such as headaches, digestive disorders, and chronic pain



#### Minor depression

Rapid onset, lasts less than 2 weeks and with only a few of the previous symptoms

Dysthymia – where mild depression symptoms are long lasting (2 years or more)

Double depression = dysthymia + an episode of major depression

#### Manic depression (bipolar disorder) - symptoms:

Abnormal or excessive elation
Unusual irritability
Decreased need for sleep
Grandiose notions
Increased talking

Racing thoughts
Increased sexual desire
Markedly increased energy
Poor judgment
Inappropriate social behaviour



# Worrying statistics about depression in the UK

Two thirds of suicides are under 35

Young men are at particular risk of suicide with dramatic increases in the last few decades (33% increase from 1980-1990 and 85% increase in 15-24 year olds)

Average age for onset on clinical depression is 30 with highest rates in young married women with children

One in five people will experience clinical depression at some stage of their lives

# Worrying statistics about depression in the UK

At least 40% of GP consultations involve mental health problems (most of which are in relation to depression)



# Worrying statistics about depression in the UK

At least 40% of GP consultations involve mental health problems (most of which are in relation to depression)

In any one week one in ten adults are significantly depressed

After puberty the incidence of depression is twice as high in women than in men

In the UK there are 5000 deaths a year from suicide and more than 100,000 suicide attempts (suicide is one of the top ten causes of death)

#### Positive and negative sides to stress, anxiety & depression

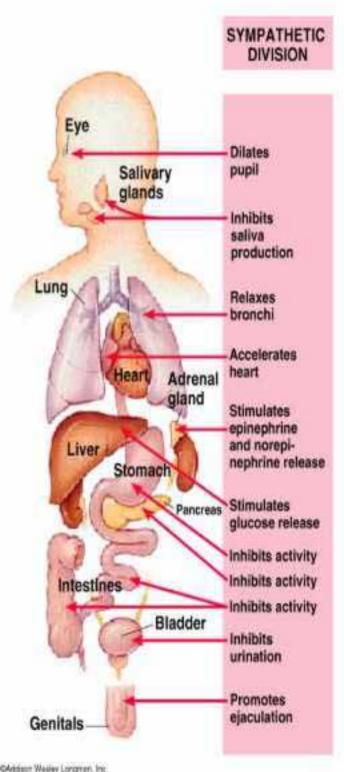
While stress, anxiety and depression reactions all have negative connotations they have evolved to promote survival

If we are faced with challenges both body and mind need to be in peak readiness for appropriate action

#### The positive side of stress, anxiety & depression

Release of stress hormones primes our muscles for action and enhance levels of arousal, attention and even cognitive skills (fight or flight)

Anxiety is a short-term anticipatory reaction that helps us to prepare for unavoidable or unpredictable events



CAddson Wesley Longrey, Inc.

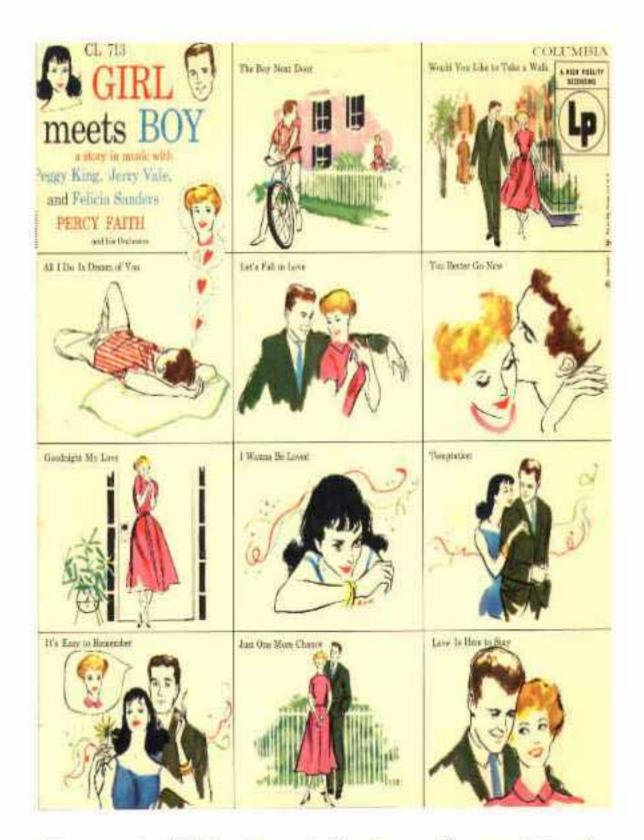
#### The positive side of stress, anxiety & depression

Depression is a protective state of submissive and withdrawn behaviour when events fail to conform to our expectations and we see no immediate solution



It can minimise exposing us to further threats and failures and attracts social support and time to develop new strategies

#### In short:



'Boy meets Girl' by Percy Faith, Peggy King and friends

#### In short:

Stress prepares us for action

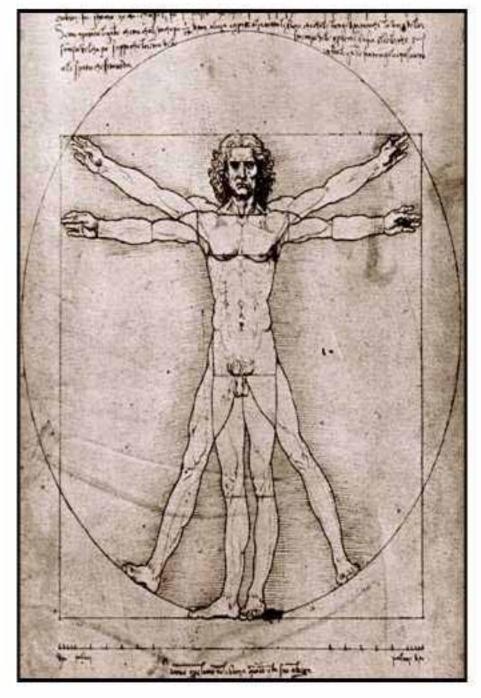
Anxiety warns us that we might not be quite up to the action required but to be ready to give it a go

Depression tells us we lack the skills to deal with something and to avoid making the same mistake again immediately without finding a solution



'Boy meets Girl' by Percy Faith, Peggy King and friends

Being in state of chronic stress damage many aspects of brain and body function



Being in state of chronic stress damage many aspects of brain and body function

Chronic anxiety states prevent us from taking action, impair judgement and can become generalised or exaggerated out

of proportion to threat



Being in state of chronic stress damage many aspects of brain and body function

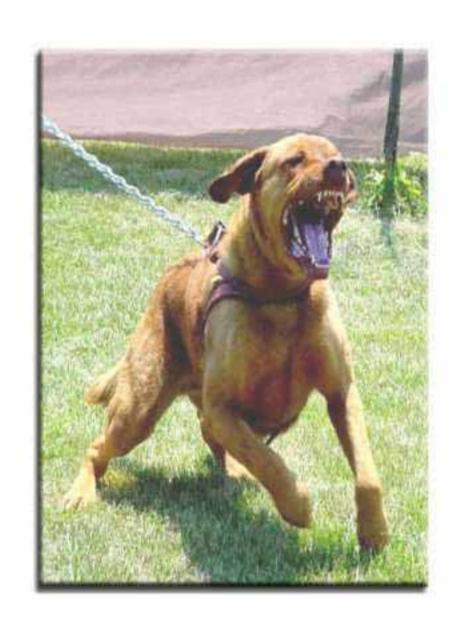
Chronic anxiety states prevent us from taking action, impair judgement and can become generalised or exaggerated out of proportion to threat

Chronic depression can lead to total negative self-esteem, social withdrawal, lack of action and self-destruction

All three can increase the likelihood of succumbing to illness and disease

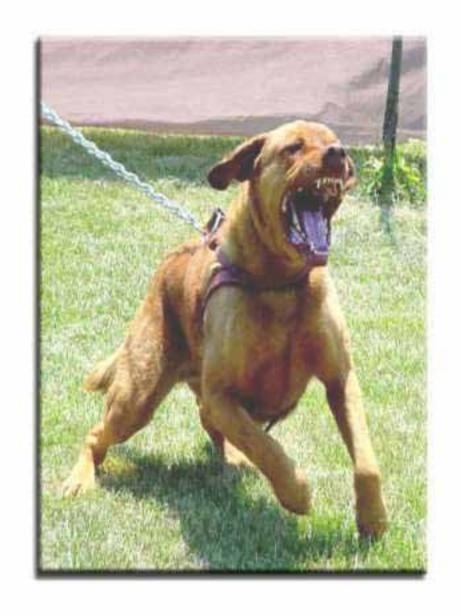


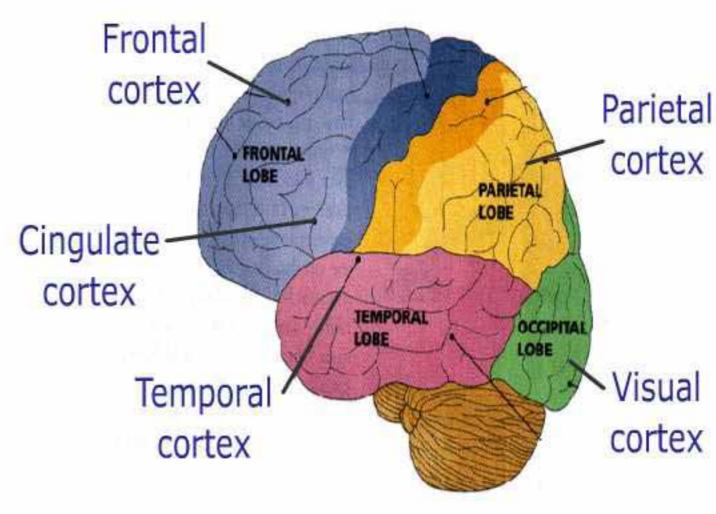
A stressor is first identified and interpreted by sensory, cognitive and emotion control centres in the brain



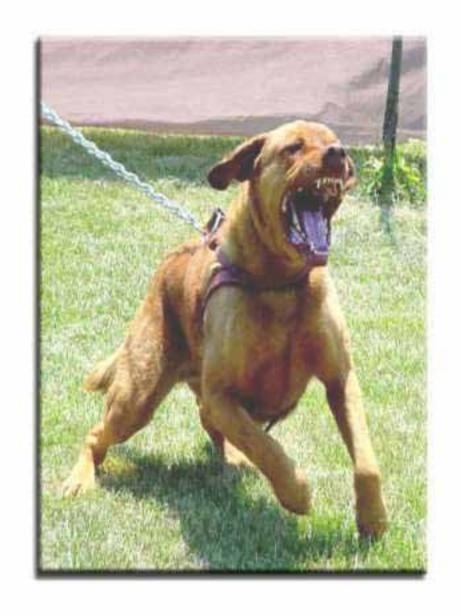


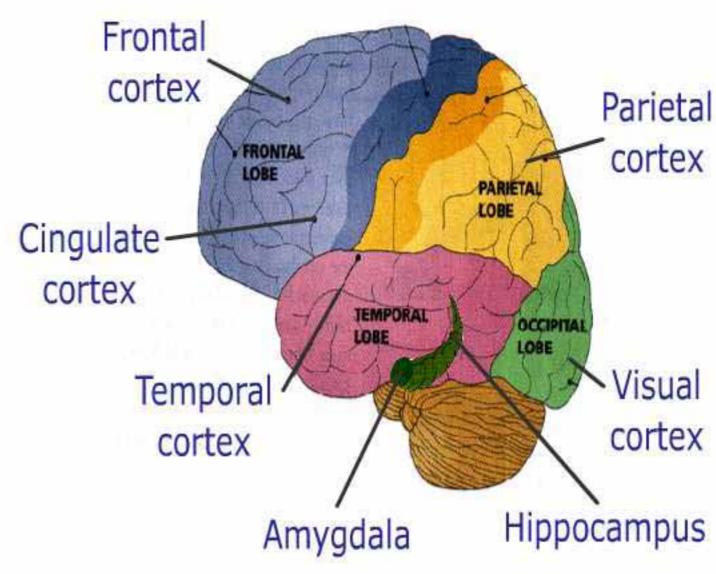
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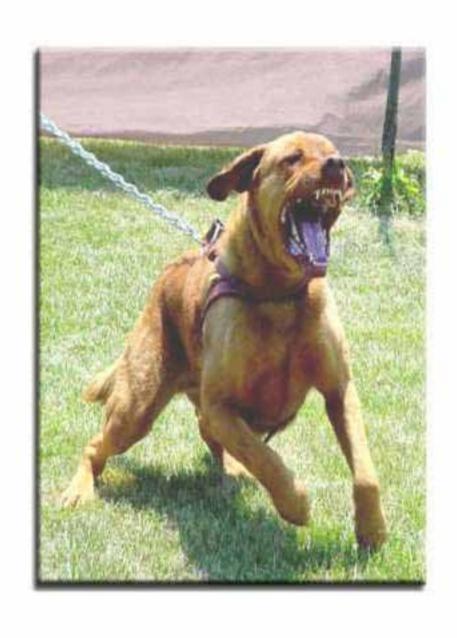


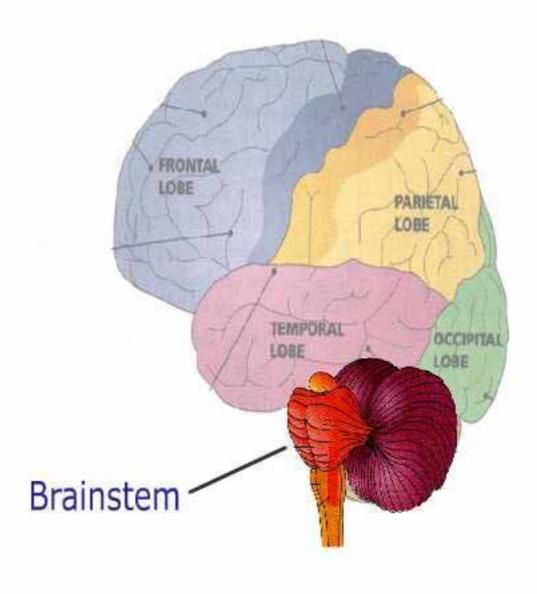
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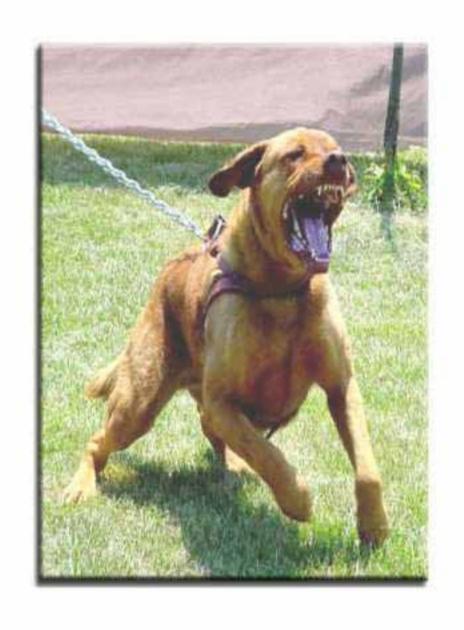


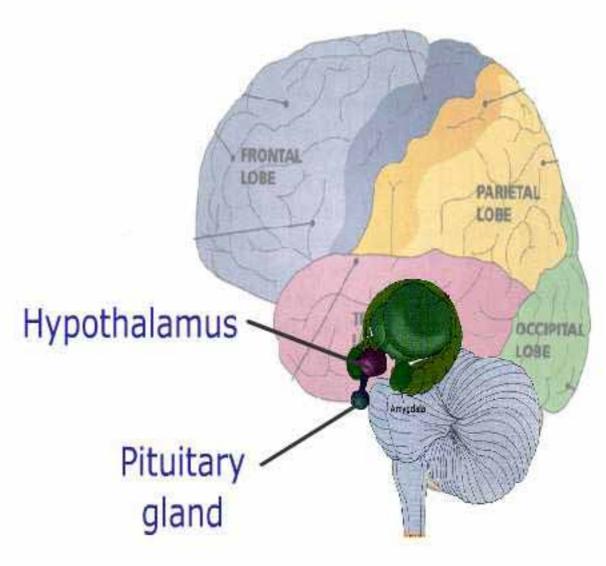
It activates brain areas controlling arousal...

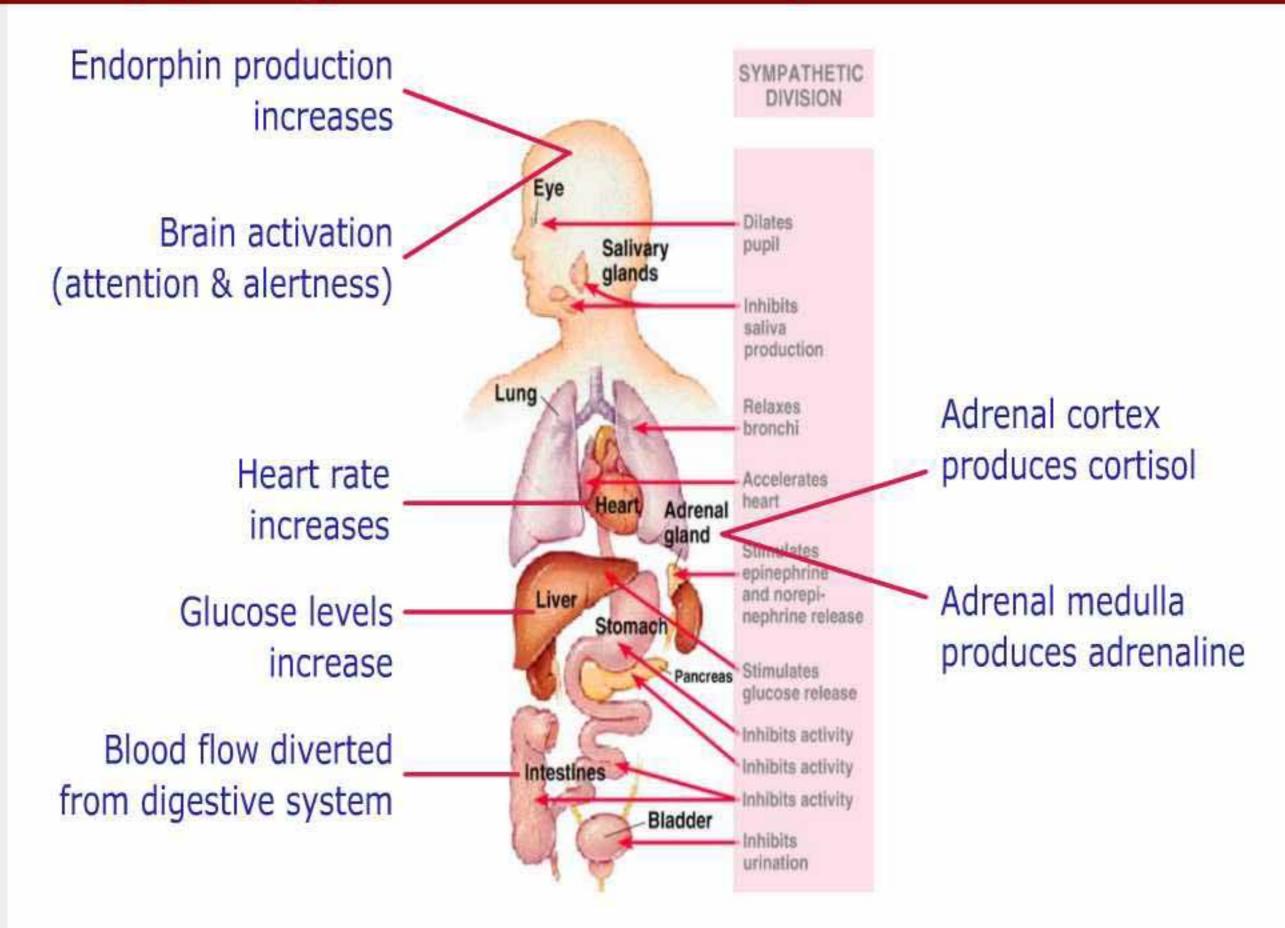




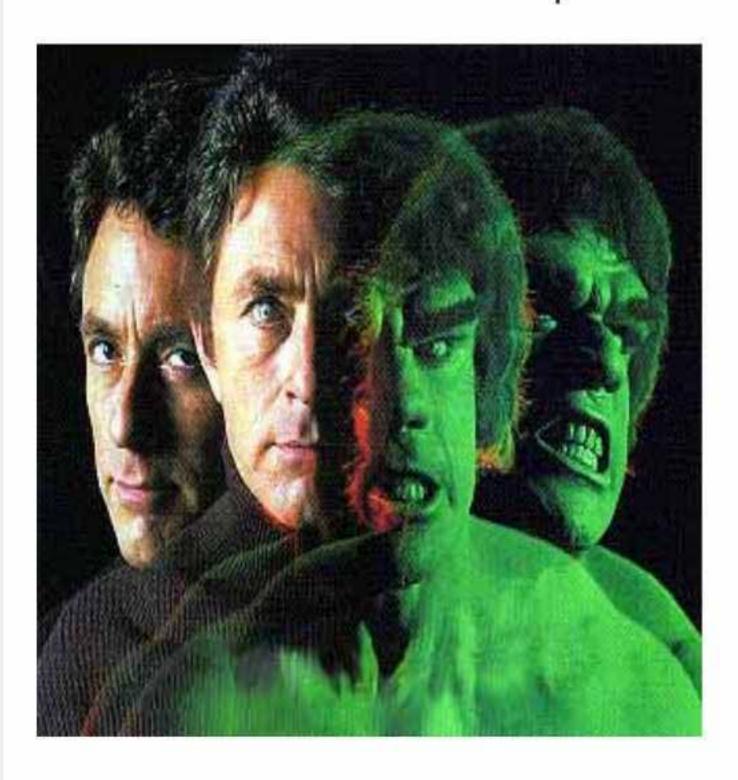
...and then brain areas regulating stress hormone release from the adrenal glands

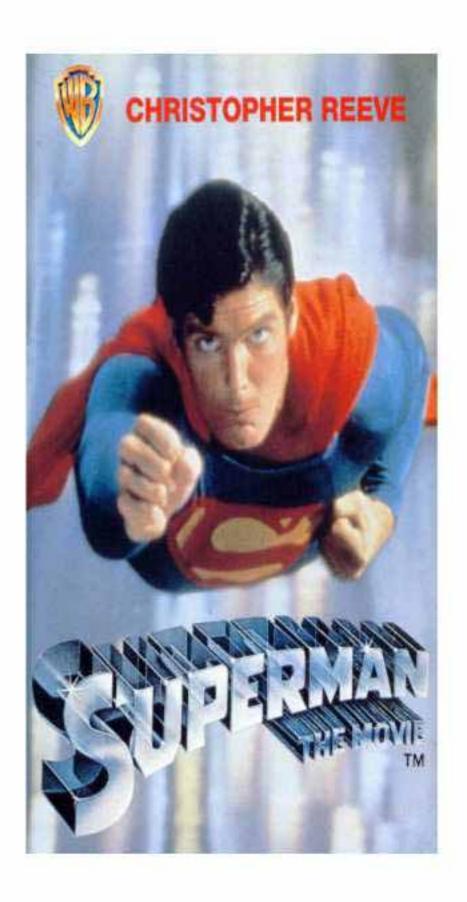






# The Incredible Hulk or Superman





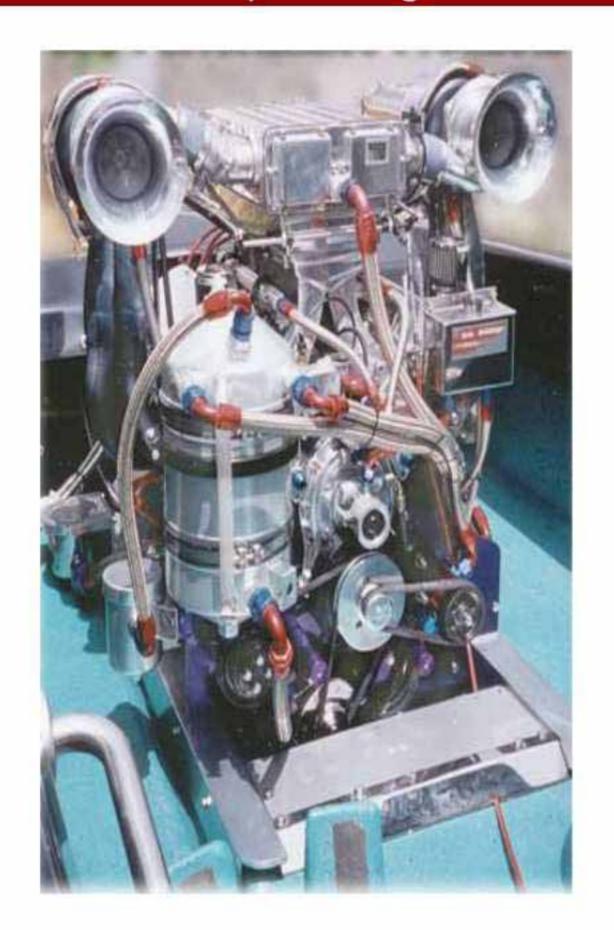
The Incredible Hulk or Superman

Psychological and physical pump-up session that turns us into winners



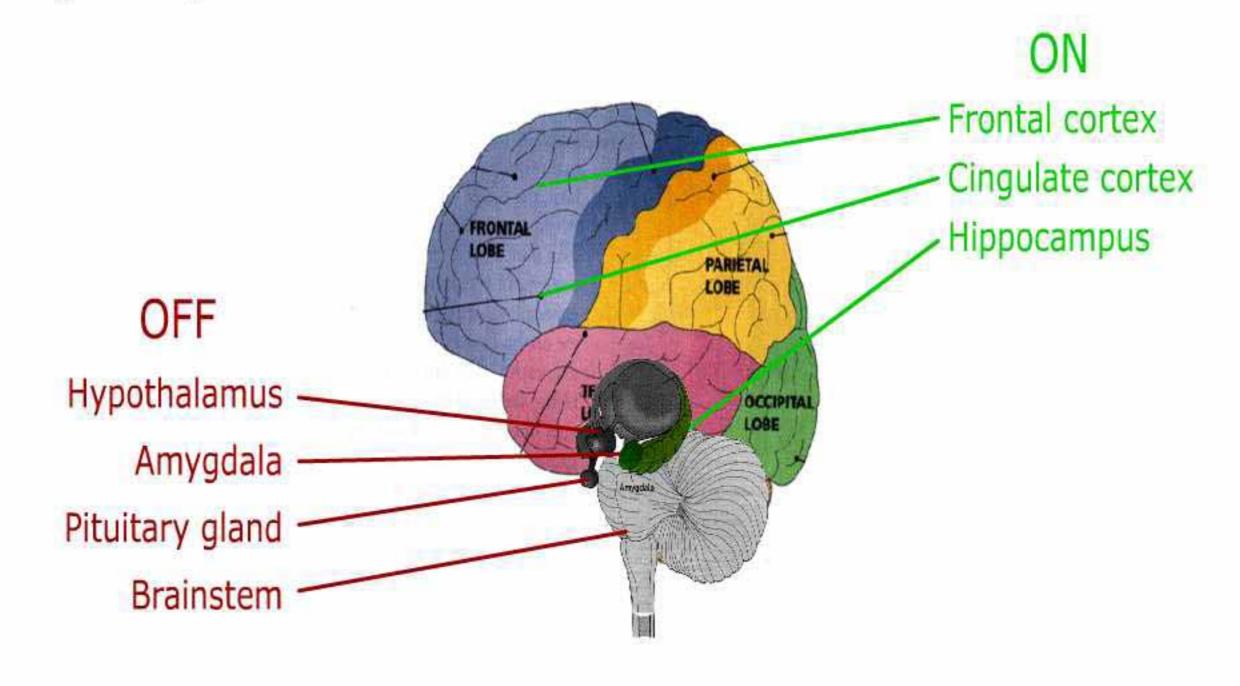


# Switching off the stress supercharger



# Switching off the stress supercharger

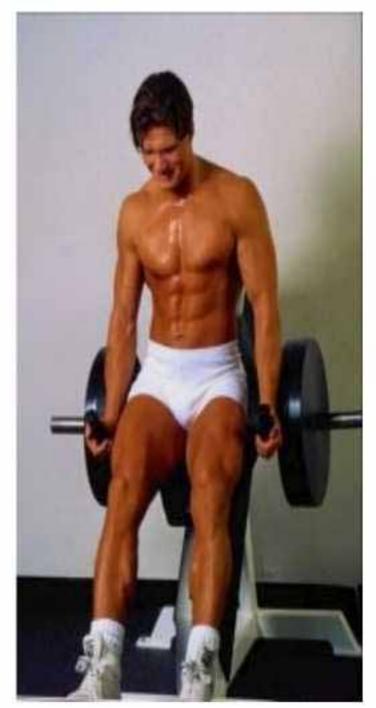
Brain centres actively switch off stress response when no longer required



# Switching off the stress supercharger

Brain centres actively switch off stress response when no longer required

Experience of short-term stress can be beneficial



#### The physiology of the chronic stress response

Experiencing constant stress is bad news for the health of any animal species

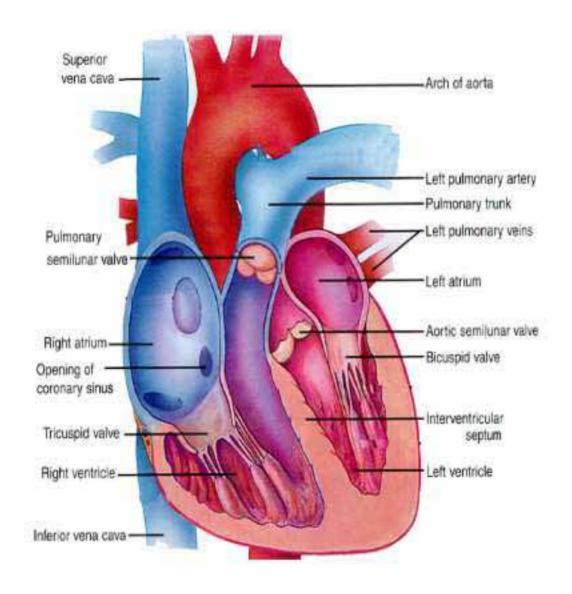
Copyright 1997 Randy Glasbergen. www.glasbergen.com



"First my ball rolled under the sofa, then my water dish was too warm, then the squeaker broke on my squeaky rubber pork chop. I've had a horrible day and I'm completely stressed out!!!"

#### Stress and the cardiovascular system

Chronic stress makes you 2.5 times more likely to experience serious cardiovascular problems

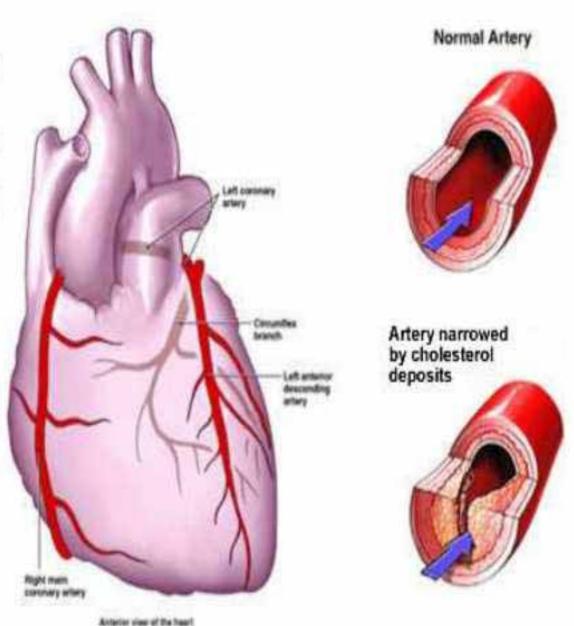


The reasons for this are not fully understood

## Stress and the cardiovascular system

Long-term effect of increased pressure on the heart by having to work harder during conditions of stress

Stress converts fat stores to fatty acids and glycerol which may contribute to fat blocking arteries



#### Stress and the cardiovascular system

Additional strains on cardiovascular function by reduced disease resistance and coping behaviours such as smoking, drinking, drug-taking and overeating







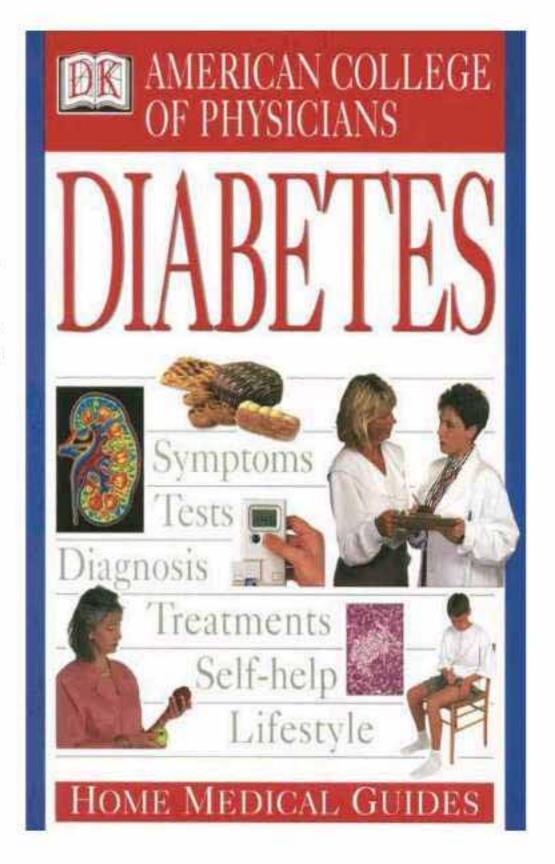


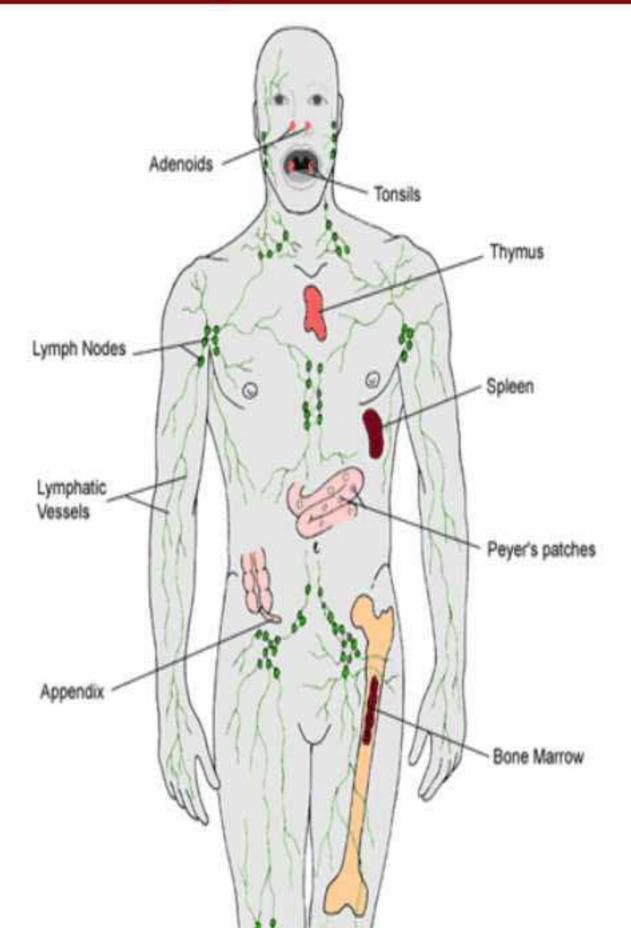
#### Stress and diabetes

Stress increases blood glucose and decreases insulin production

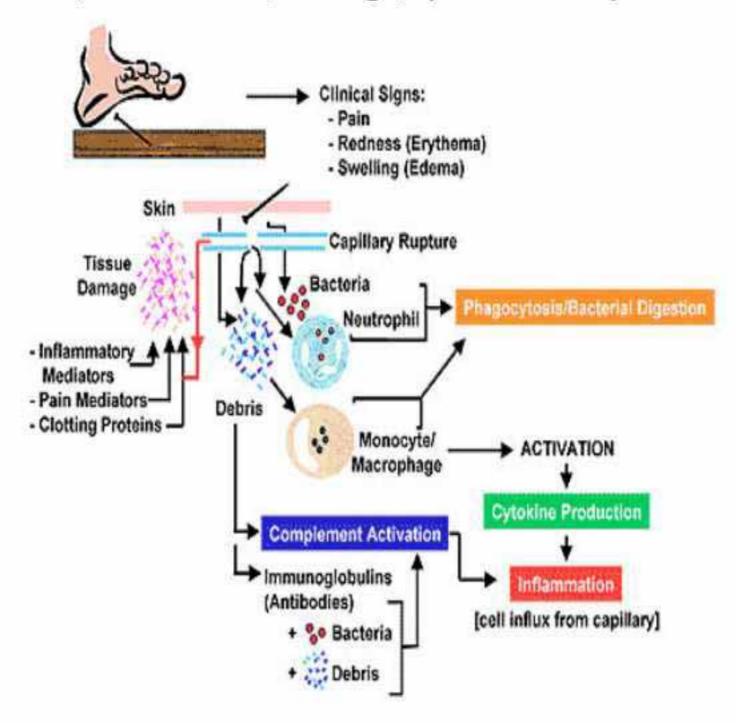
Stress may not cause diabetes per se but could hasten its onset through increased demands

Stress control very important once an individual has become diabetic

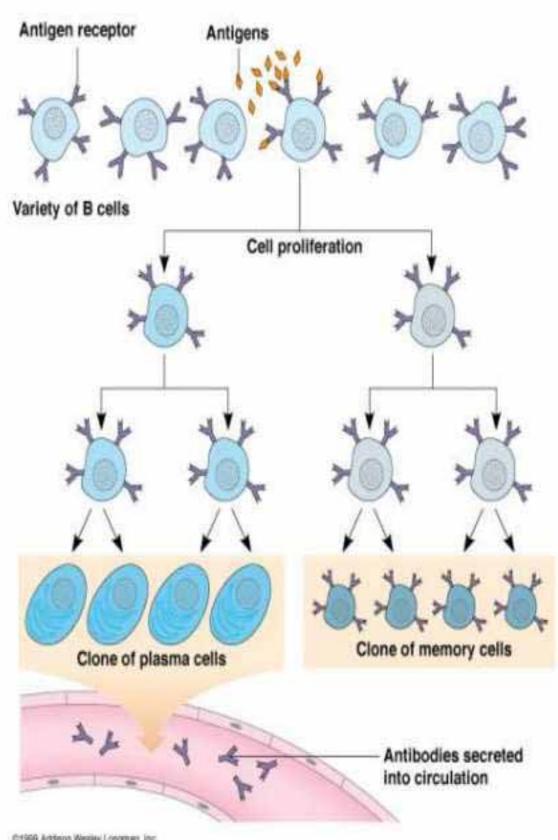




Innate system: first line of defence against infectious agents (viruses, bacteria, fungi, parasites)



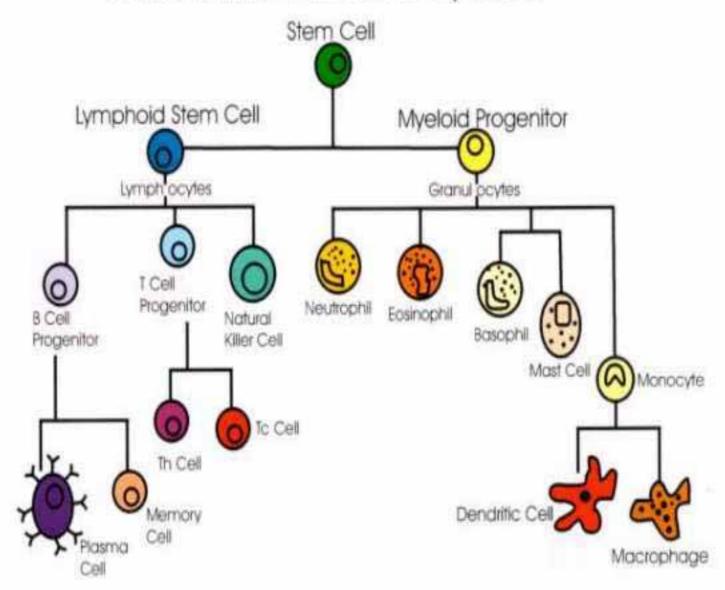
Adaptive system: produces a specific reaction to each pathogen (antigen) which will eradicate it



C1909 Addison Wesley Longman, Inc.

Both divisions of the immune system produce humoral (molecules) and cellular (leucocytes) factors which act in a co-ordinated way to counter infectious agents

Cells of the Immune System



A review of 300 studies over the last 30 years by Segerstrom & Miller in 2004 concludes:



Suzanne Segerstrom



Gregory Miller

A review of 300 studies over the last 30 years by Segerstrom & Miller in 2004 concludes:

Acute stressors (lasting minutes) boost natural immunity while suppressing some aspects of specific immunity



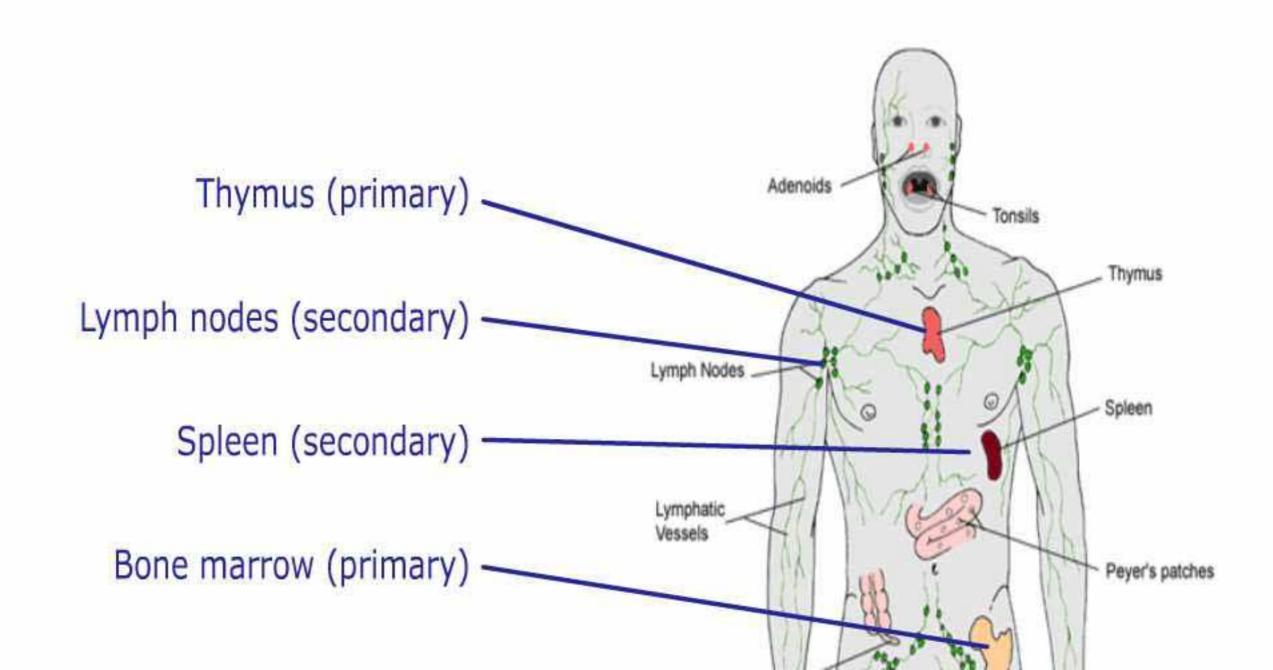
A review of 300 studies over the last 30 years by Segerstrom & Miller in 2004 concludes:

Acute stressors (lasting minutes) boost natural immunity while suppressing some aspects of specific immunity

Chronic stressors cause broad suppression of both cellular and humoral immunity, while subjective reports of stress do not associate well with these immune changes

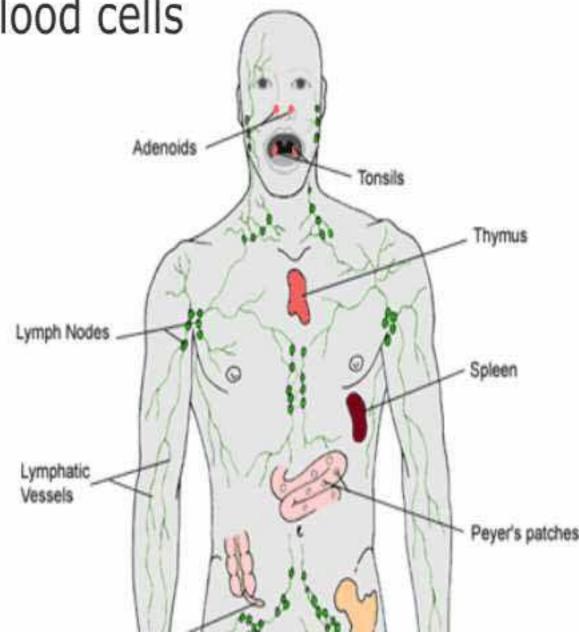
# So how can stress influence the immune system?

Sympathetic projections to primary and secondary lymphoid tissues act on white blood cell receptors



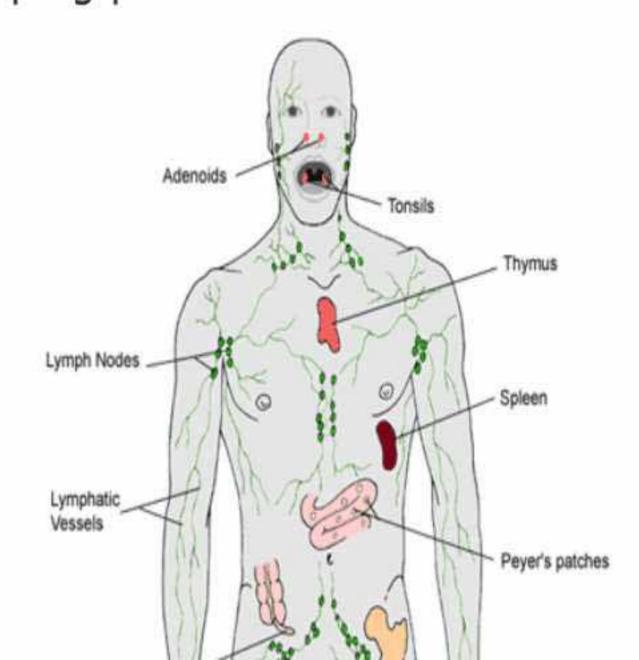
# So how can stress influence the immune system?

Adrenal peptides (cortisol and adrenaline), pituitary peptides (prolactin, growth hormone) and brain peptides (melatonin, β-endorphin) all bind to receptors on white blood cells



# So how can stress influence the immune system?

Immunocompetence can also be influenced indirectly as a result of inappropriate stress-management regimes such as alcohol abuse and altered sleeping patterns

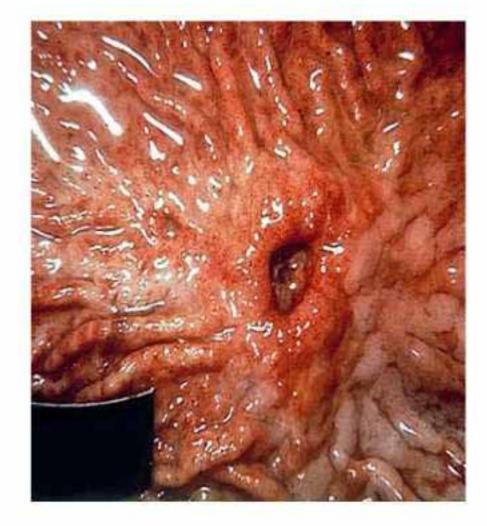


#### Stress and ulcers

Stress increases levels of hydrochloric acid, and therefore acidity, in the stomach

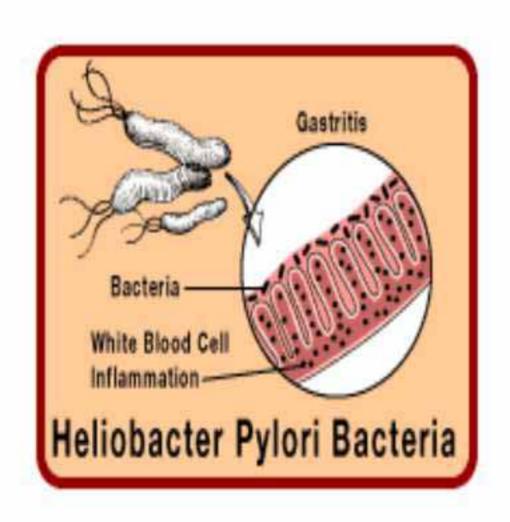
For many years stress was thought to be the psychosomatic

cause of stomach ulcers



#### Stress and ulcers

In 1982 it was discovered that ulcers actually caused by a virulent bacterium known as Helicobacter pylori



#### Stress and ulcers

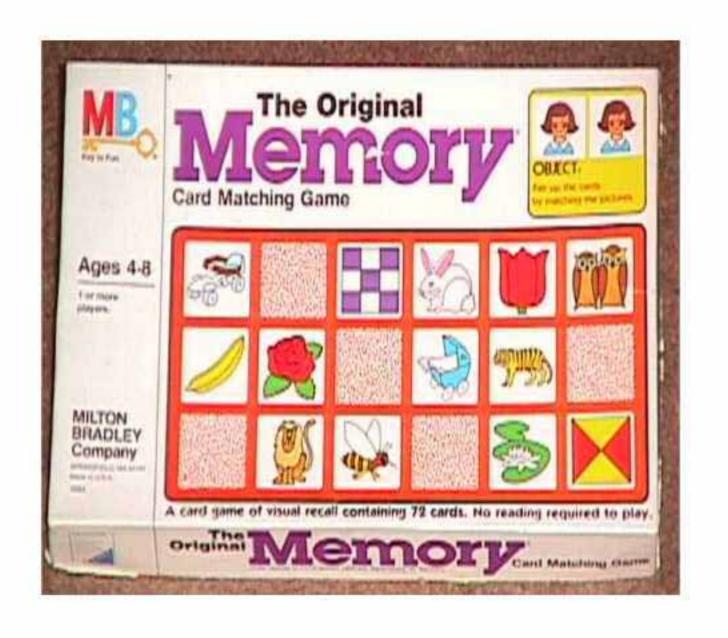
In 1982 it was discovered that ulcers actually caused by a virulent bacterium known as Helicobacter pylori

Only two out of ten individuals with this bacterium actually develop stomach ulcers, though this doubles in individuals with significant levels of stress

The bacterium can be treated with ampicillin and metronidrazole

## Stress, neurodegeneration and memory

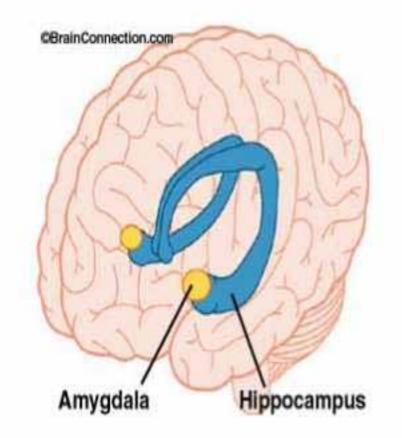
While memories linked to stressful and highly emotional experiences are very durable significant stress can impair general learning and memory skills



# Stress, neurodegeneration and memory

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The hippocampus contains receptors for adrenal stress hormones, notably corticosterone and cortisol



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The hippocampus contains receptors for adrenal stress hormones, notably corticosterone and cortisol

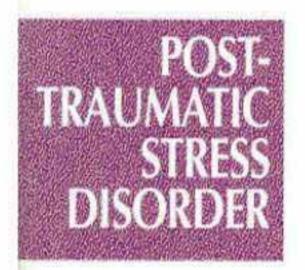
When these receptors become activated they alter metabolic functions of the brain cells compromising their structure and function and ultimately survival

# Stress, neurodegeneration and memory

In humans, patients with post-traumatic stress disorder have significant hippocampal atrophy and problems with memory recall

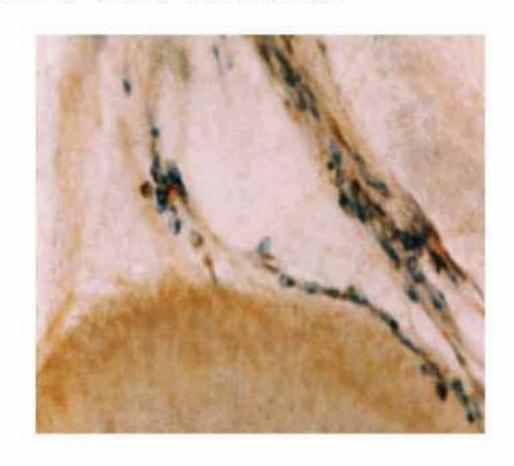
Giving humans cortisol artificially also impairs aspects of memory associated with hippocampal function

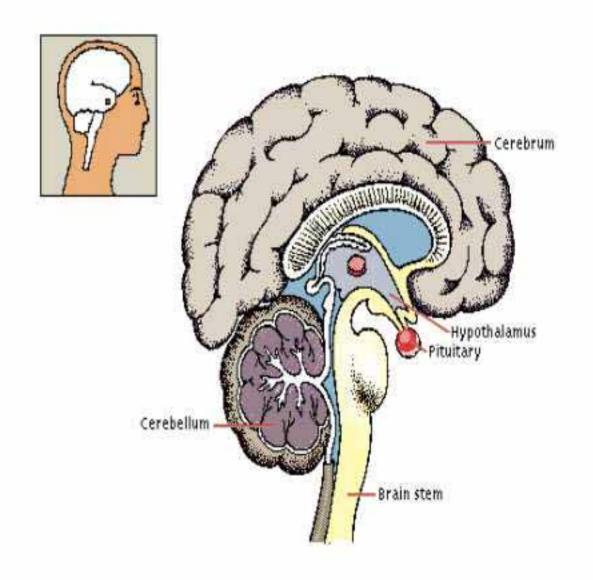




Kay Marie Porterfield

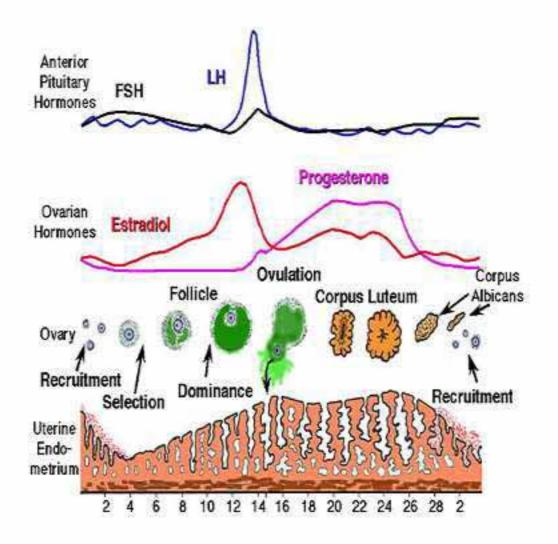
Stress suppresses gonadal hormone production in both males and females





Stress suppresses gonadal hormone production in both males and females

Interferes with female ovarian/menstrual cycles



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Interferes with female ovarian/menstrual cycles

Reduces sperm production



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Interferes with female ovarian/menstrual cycles

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Reduces interest in sex



Stress suppresses gonadal hormone production in both males and females

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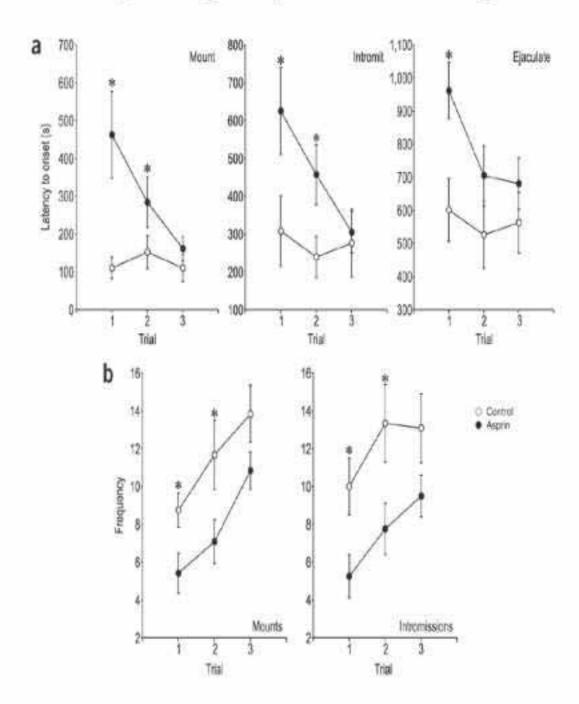
Reduces sperm production

Reduces interest in sex

Where mothers experience significant prenatal stress this can feminise male offspring

Anti-inflammatory drugs (aspirin) taken during pregnancy can produce feminized male offspring by inhibiting sexual

differentiation of the brain

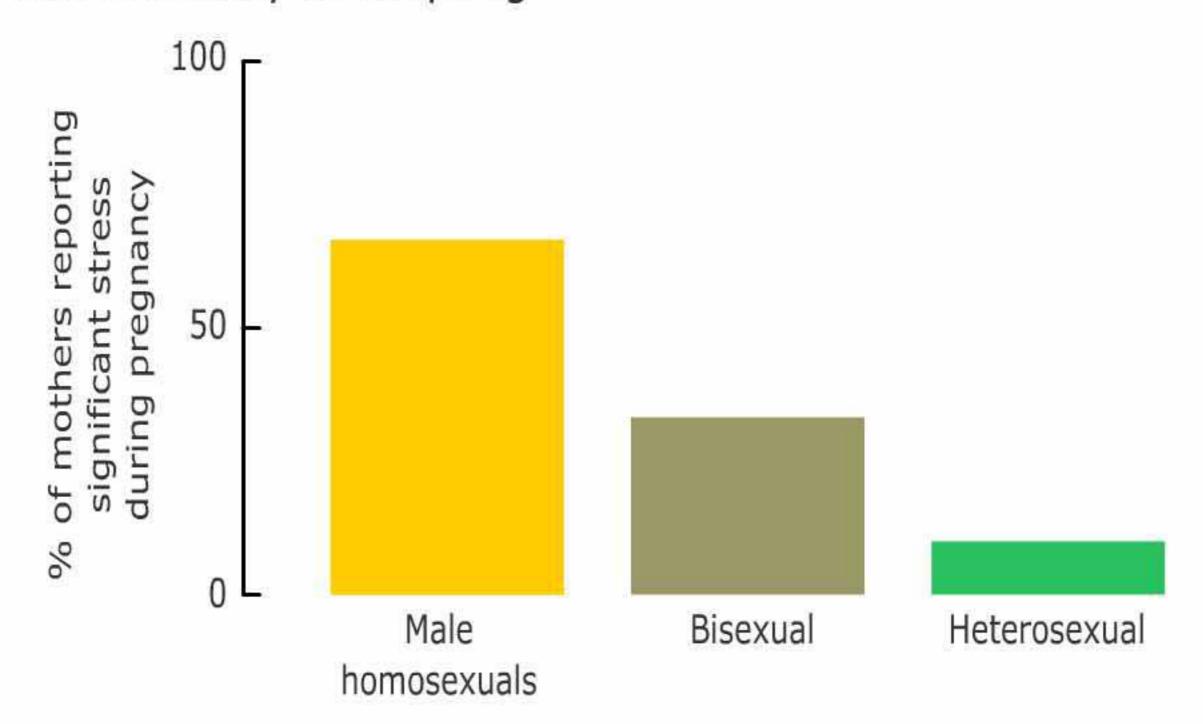


Amateau & McCarthy Nature Neuroscience 2004

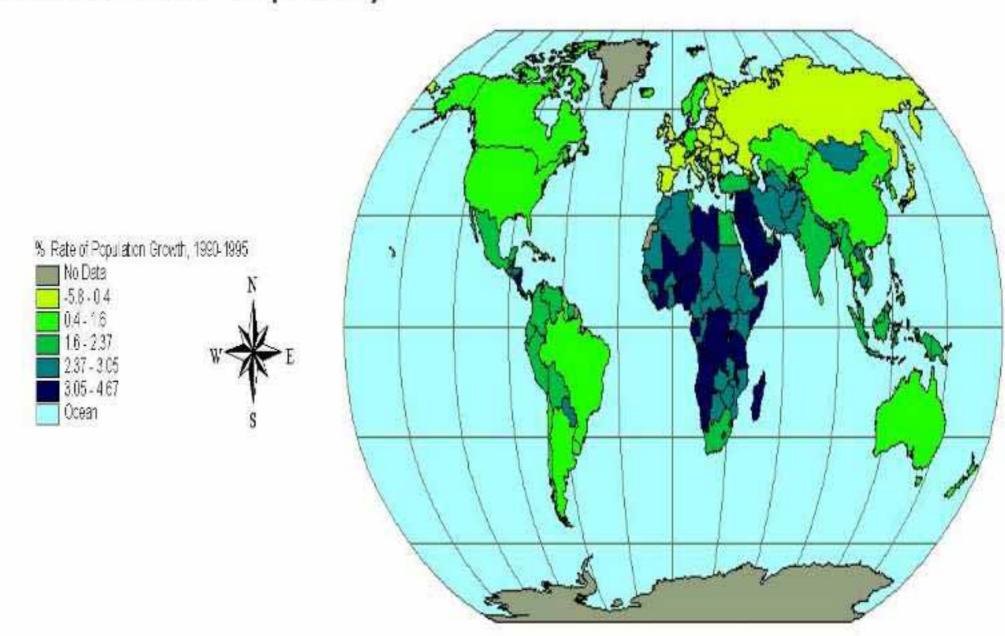
Anti-inflammatory drugs (aspirin) taken during pregnancy can produce feminized male offspring by inhibiting sexual differentiation of the brain

So both experience of stress and taking some medications which help relieve its symptoms can feminise male offspring

Prenatal stress correlates with a higher incidence of homosexuality in offspring



Population growth in mammals usually stabilises itself below environmental capacity



Population growth in mammals usually stabilises itself below environmental capacity

John Christian proposed that this is achieved by a form of

population self regulation (1950)

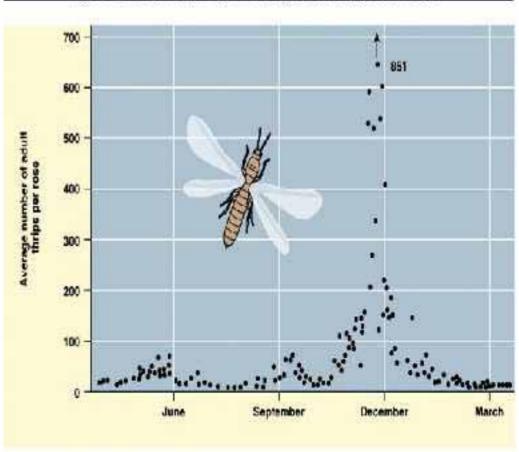
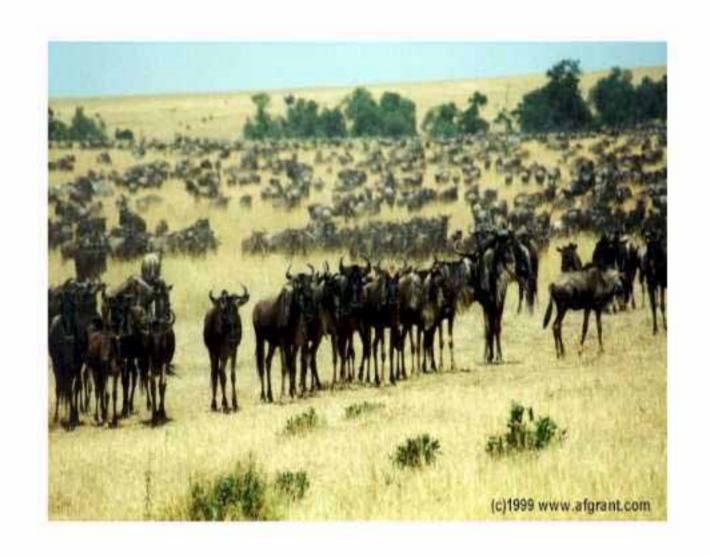


Figure 52 18 Density-independent regulation of population size

Coprige Premar Eduatur, in jubliching reBaguer i Cantring :

Stress of overcrowding reduces fertility and compromised immune and cardiovascular systems increase premature mortality



Stress of overcrowding reduces fertility and compromised immune and cardiovascular systems increase premature

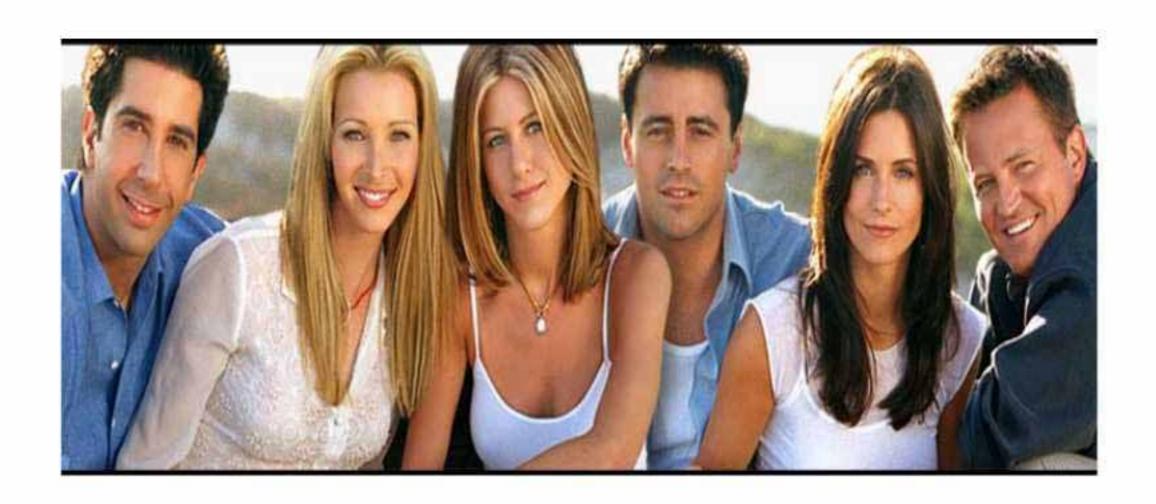
mortality

Increasing human populations ?



#### Social stress

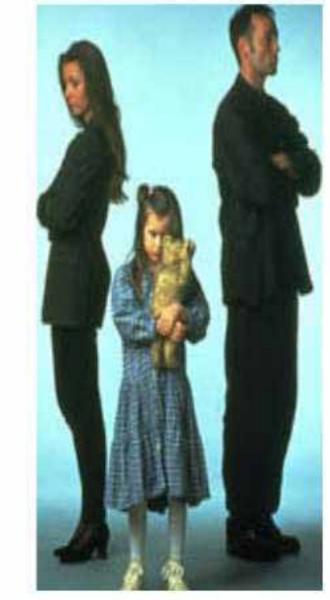
Social relationships are both a potent source of happiness, protection and relief from stress but can also result in abject misery and considerable stress



#### Social stress

Social relationships are both a potent source of happiness, protection and relief from stress but can also result in abject misery and considerable stress

Main psychological stressors for humans are death of a loved one and breakdown of relationships



#### Social stress

Bullying in the workplace - one in four workers reporting this experience in the UK and elsewhere www.bullyonline.org/workbully/costs.htm



Those who can, do. Those who can't, bully.

A page from Bully OnLine, web site of the UK National Workplace Bullying Advice Line

In other species social stress can sometimes kill in a few days

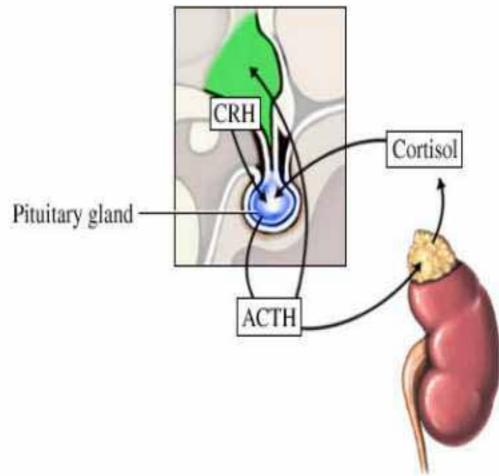






In other species social stress can sometimes kill in a few days

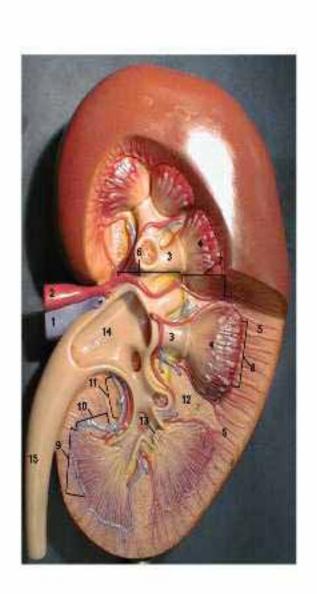
Defeated animals have 6-fold increase in adrenal cortisol levels



In other species social stress can sometimes kill in a few days

Defeated animals have 6-fold increase in adrenal cortisol levels

Where no active responses made animals can die of kidney failure in a week



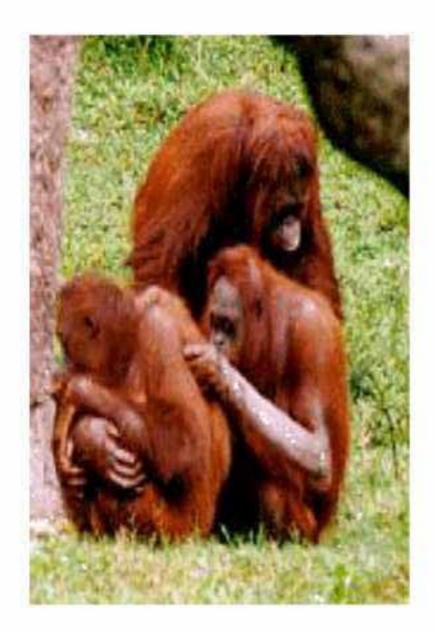
In other species social stress can sometimes kill in a few days

Defeated animals have 6-fold increase in adrenal cortisol levels

Where no active responses made animals can die of kidney failure in a week

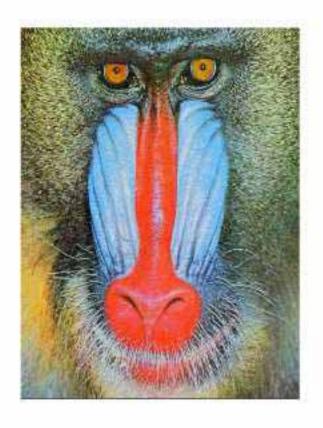
This even happens when the defeated animal is physically separated from the victor but can still see them!

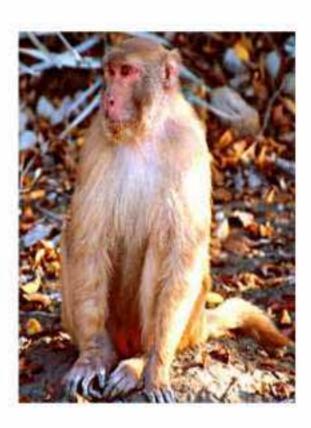
In primates position in the social hierarchy affects stress levels



In primates position in the social hierarchy affects stress levels

In baboons, rhesus and talapoin monkeys dominant male monkeys have lower heart rates and cortisol levels than subordinate ones







In primates position in the social hierarchy affects stress levels

In baboons, rhesus and talapoin monkeys dominant male monkeys have lower heart rates and cortisol levels than subordinate ones

In unstable social hierarchies the opposite situation may occur

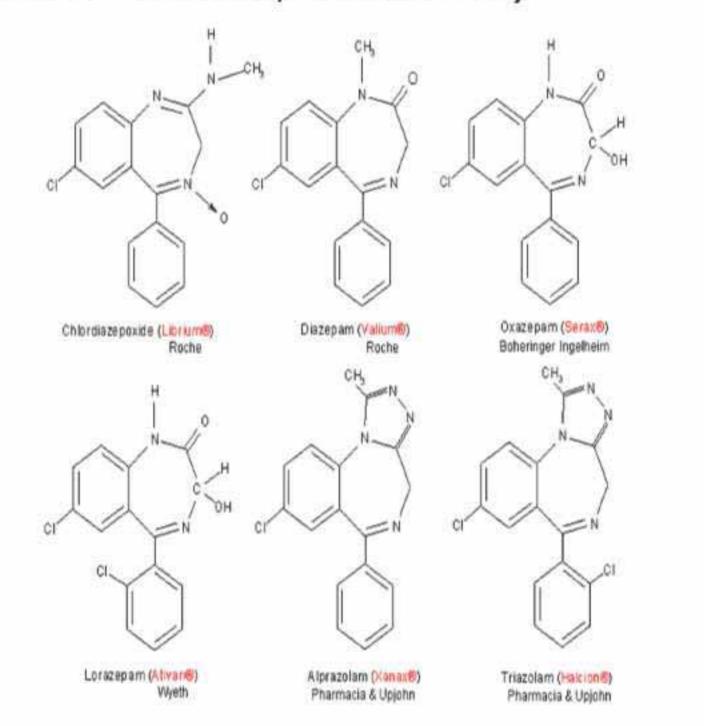
Drug treatments show that for dominant animals stress is anxiety-related

For subordinate animals it is depression-related



### Drug treatments for chronic stress

Either activate the brain's inhibitory systems.... (benzodiazepines - librium, valium etc)

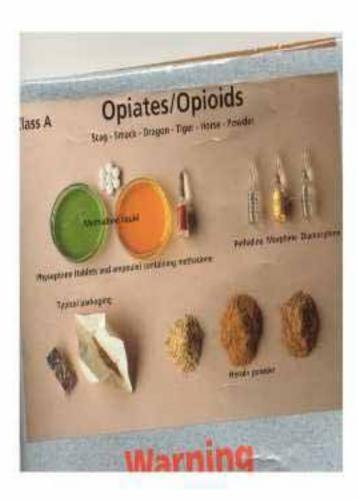


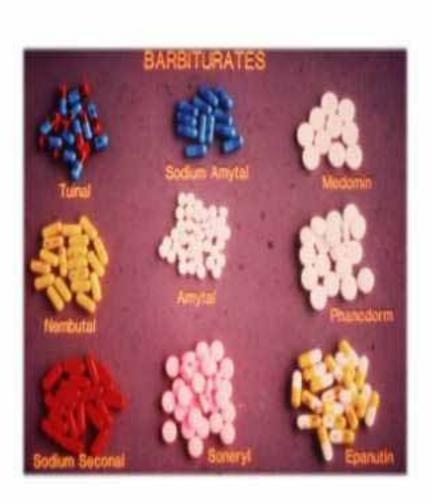
## Drug treatments for chronic stress

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...or produce anaesthetic effects such as alcohol, opiates and barbiturates







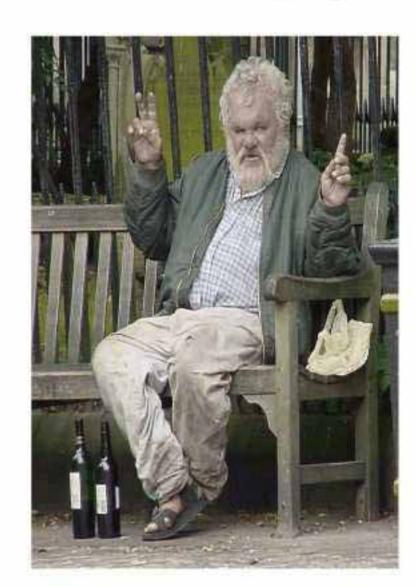
## Drug treatments for chronic stress

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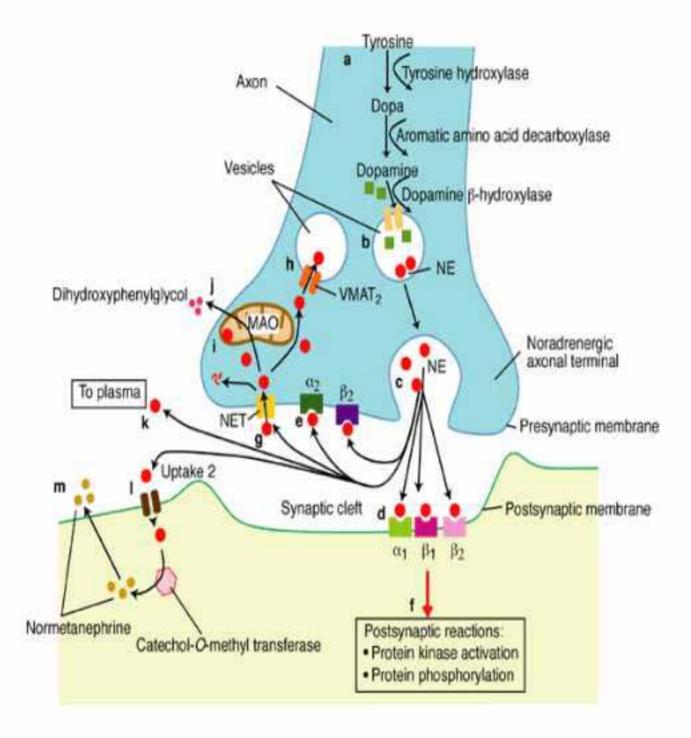
...or produce anaesthetic effects such as alcohol, opiates

and barbiturates

These act fast but are addictive



Anxiety is caused by excessive excitatory neurotransmission in the brain

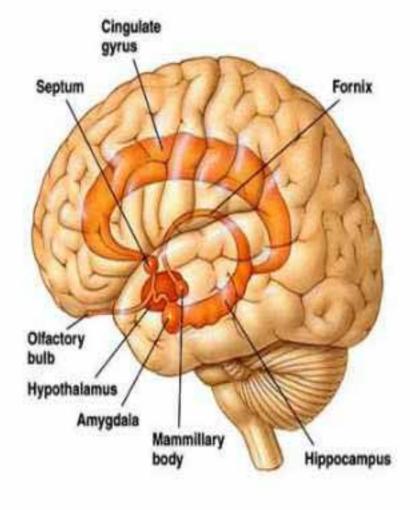


Anxiety is caused by excessive excitatory neurotransmission in the brain

Drug treatments have therefore tended to be the same as for chronic stress

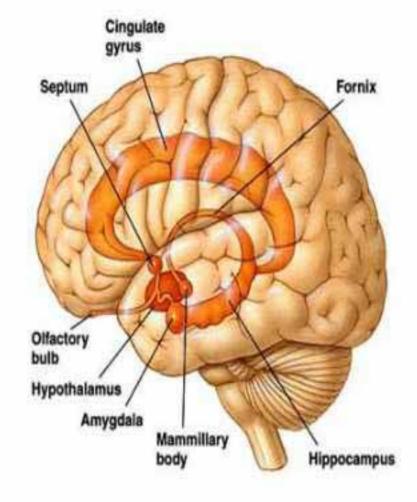
Anxiety disorders are associated with general increased activity in the cingulate cortex and parahippocampal

gyrus....



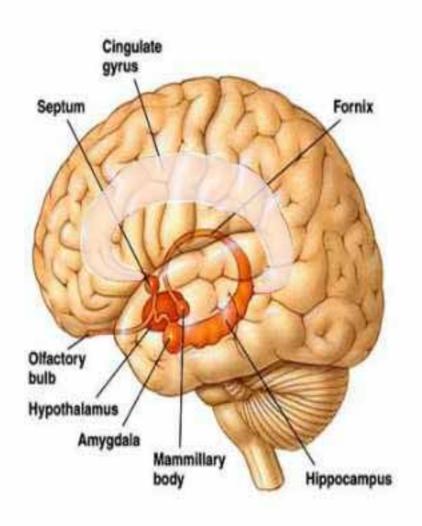
Anxiety disorders are associated with general increased activity in the cingulate cortex and parahippocampal

gyrus....



...and anxiety-provoking stimuli have greater effect on the amygdala, parahippocampal gyrus and frontal cortex

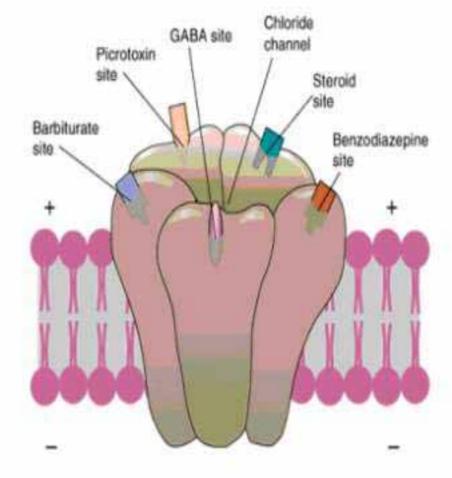
Removal of the cingulate gyrus can prevent symptoms of obsessive compulsive disorder



Removal of the cingulate gyrus can prevent symptoms of obsessive compulsive disorder

Animal studies have found that anxiety-reducing actions of benzodiazepines are mediated via GABA receptors in these

regions



## SSRIs and treatment for anxiety

Anxiety disorders are now often treated with selective serotonin re-uptake inhibitors (SSRIs)

Prozac, Zoloft, Celexa and Paxil



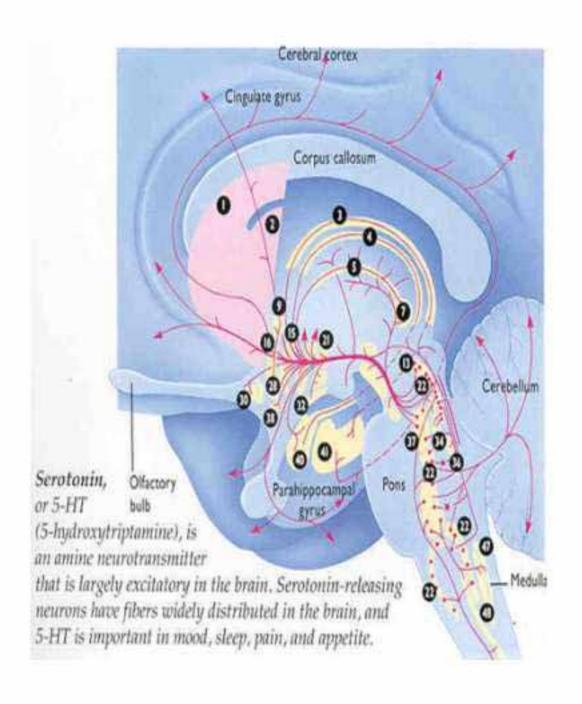






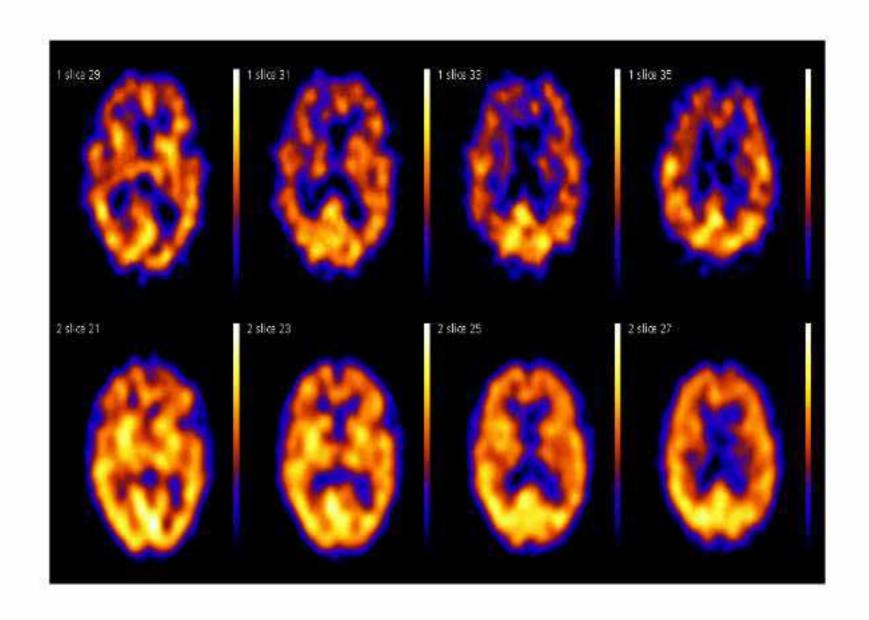
## SSRIs and treatment for anxiety

They boost the amount of the neurotransmitter serotonin available for influencing brain activity



### SSRIs and treatment for anxiety

Brain imaging studies have shown that these drugs also reduce the levels of excitation in areas associated with anxiety symptoms

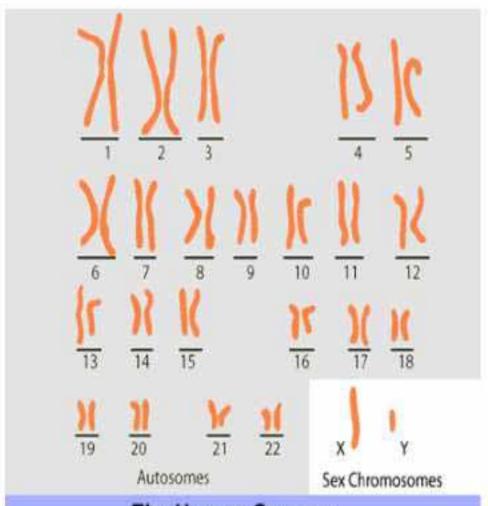


### SSRIs and treatment for anxiety

Their main advantage is that they are non-addictive although they are slow to act - generally 2-4 weeks

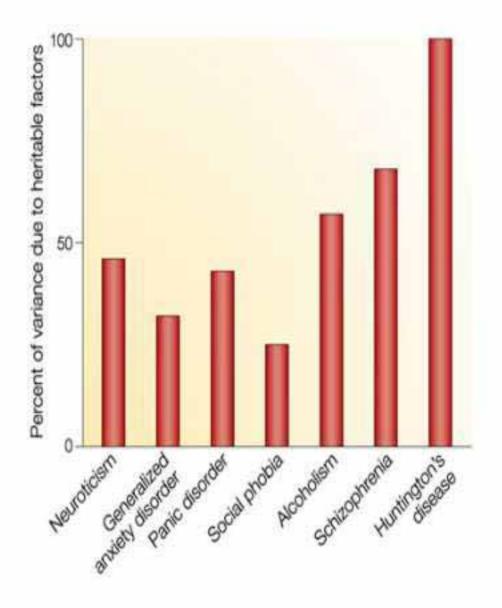
Therapeutic actions seem to require some structural alterations within the brain

Studies on monozygotic and dizygotic twins find only 30-40% genetic contribution



#### The Human Genome

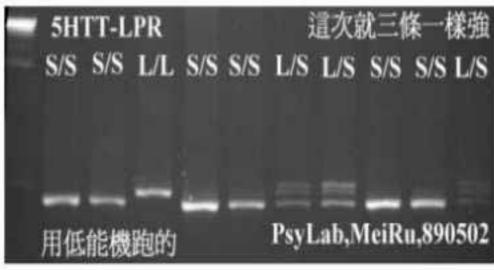
The Human Genome is the total of the genetic information that is held in each human cell. It is usually made up of 46 chromosomes: 22 pairs of autosomes and 1 pair of sex chromosomes, which are usually X and X for females and X and Y for males.



Small predisposition for anxiety in individuals that carry a specific variant of the serotonin transporter gene (5-HTT)

5HTT-LPR genotyping





Small predisposition for anxiety in individuals that carry a specific variant of the serotonin transporter gene (5-HTT)

32% of Caucasian populations carry two shorter alleles in the promoter of this gene, have less brain 5-HTT and a higher score for neuroticism

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Even as babies, individuals carrying this form of the gene have increased anxiety scores



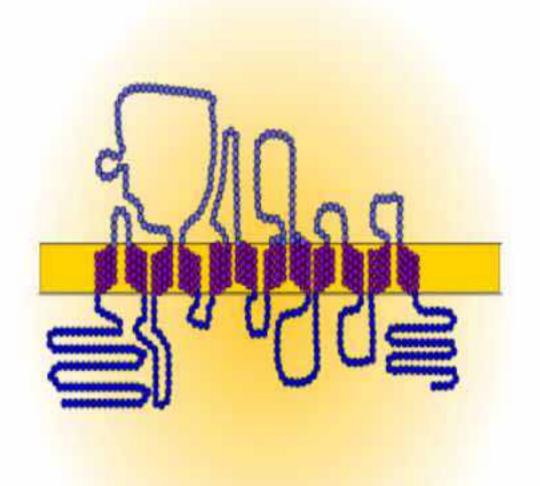
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Even as babies, individuals carrying this form of the gene have increased anxiety scores

Individuals carrying this form of the gene show potentiated activation to fearful faces in the amygdala

Conundrum - inhibiting 5-HTT in adulthood is anxiolytic but doing the same throughout life is anxiogenic



The 12 membrane-spanning human serotonin transporter

Conundrum - inhibiting 5-HTT in adulthood is anxiolytic but doing the same throughout life is anxiogenic

Work in mice lacking expression of the 5-HTT gene has confirmed anxiogenic effects

Pharmacological blockade of the transporter in the first two weeks of life produces the same effect

May help explain why SSRIs are associated with problems when given to children

The 12 membrane-spanning

human serotonin transporter

Brain chemical systems which promote formation of social bonds (notably oxytocin, vasopressin and opioids) can also act as anxiogenics

Vasopressin Cys-Tyr-Phe-Gln-Asn-Cys-Pro-Arg-Gly-NH<sub>2</sub>

Opioids P & Glu-Gly-Lys-Lys-Tyr-Ala-Asn-Lys-Ile-Ile-Ala-Asn-Lys-Phe-Leu-Thr-Val-Leu-Pro-Thr-Gln-Ser-Lys-Glu-Ser-Thr-Met-Phe-Gly-Gly-Tyr-NH<sub>2</sub>

Mice lacking the genes for producing these substances show significantly reduced anxiety







Mice lacking the genes for producing these substances show significantly reduced anxiety







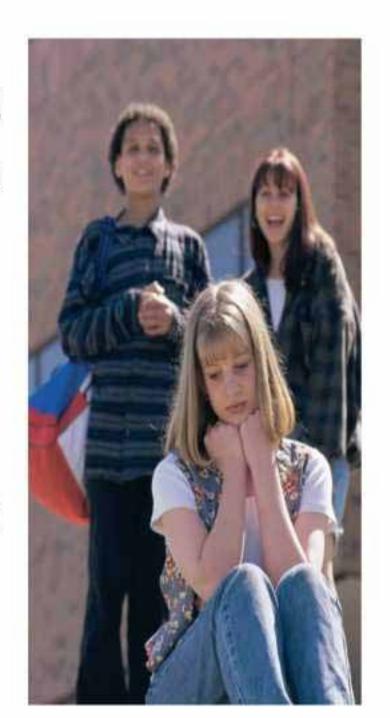
Similar findings have been reported in sheep and monkeys using drug treatments

The need to be social also makes us anxious

The pleasure of positive social interactions may partly be caused by relief from anxiety

Is being asocial a way to avoid anxiety?

Drugs that inhibit social reward have been used to treat autism



In the rat, experience of low contact maternal care causes development of high stress/anxiety in offspring



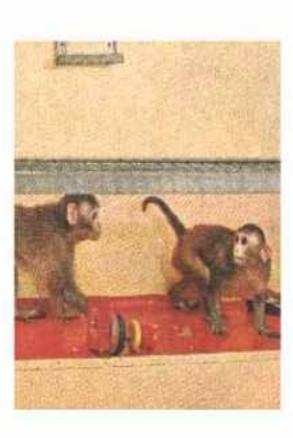
In the rat, experience of low contact maternal care causes development of high stress/anxiety in offspring

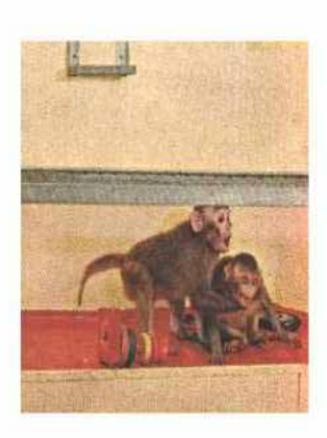
Reduces activity in brain inhibitory systems

Shortening period of maternal care in rodents also causes higher levels of stress and aggression

Both monkeys and humans experiencing a lack of appropriate maternal care are also more likely to show higher stress and anxiety



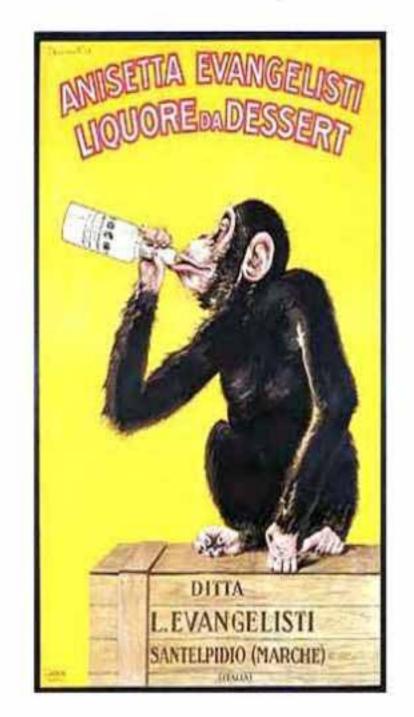




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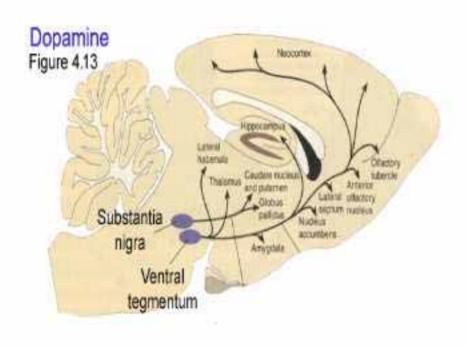
higher stress and anxiety

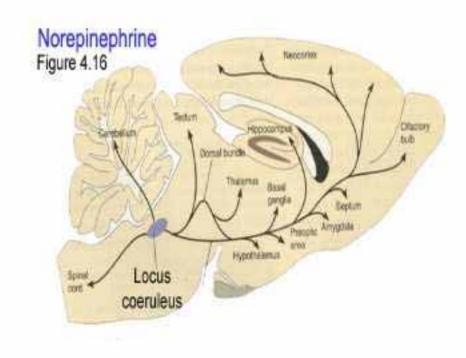
Predisposition towards addiction to alcohol or drugs

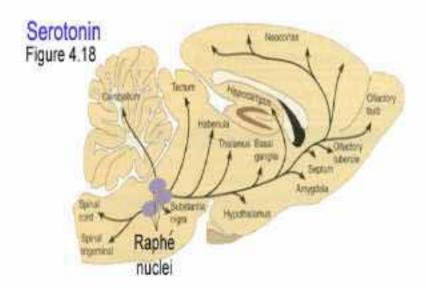


### The physiology and treatment of depression

#### Deficiencies in brain monoamine transmitters





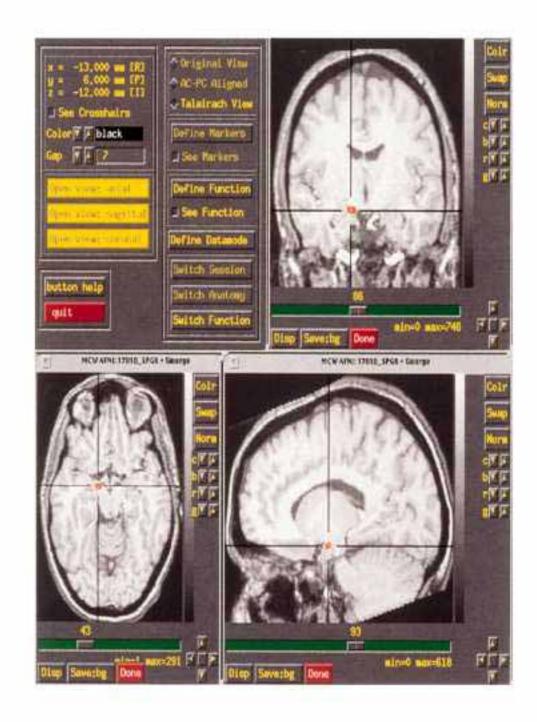


## The physiology and treatment of depression

#### Deficiencies in brain monoamine transmitters

Overactivity in key brain regions dealing with the control of emotions (orbitofrontal and cingulate cortices, ventral striatum and medial thalamus)

Permanent brain changes may mean a necessity for lifetime medication



There is a wide range of anti-depressant drugs



There is a wide range of anti-depressant drugs

The first one that you may be prescribed has only about a 50:50 chance of working



With persistence, and changing and combining medications success rate with major depression and dysthymia can be greater than 80%











With persistence, and changing and combining medications success rate with major depression and dysthymia can be greater than 80%

Drugs do not alter your perceptions or make you feel good

- they restore your normal abilities to think and feel



Major class of drugs used for treatment of depression are the SSRIs









Major class of drugs used for treatment of depression are the SSRIs

Other drugs (Venlafaxine, minacipran and trianeptine) increase availability of both serotonin and noradrenaline and are called SNaRIs

venlafaxine hydrochloride

Major class of drugs used for treatment of depression are the SSRIs

Other drugs (Venlafaxine, minacipran and trianeptine) increase availability of both serotonin and noradrenaline and are called SNaRIs

Older treatments include: trycyclic compounds (imipramine) monoamine oxidase inhibitors (tranylcypromine)

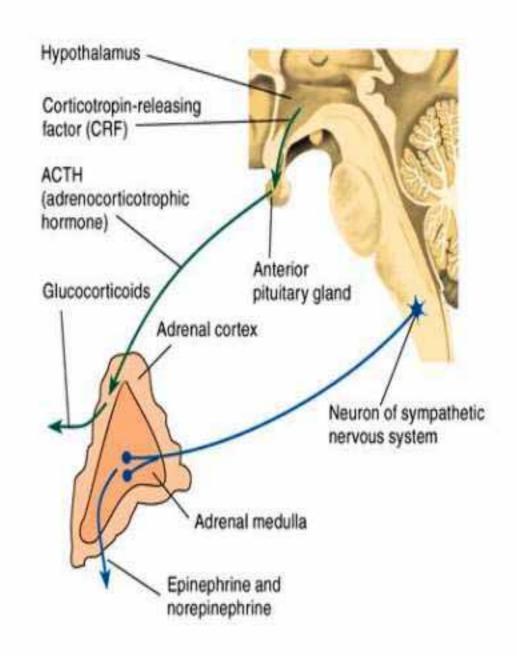
mipramine

Treatment of manic depression - lithium and anticonvulsant agents such as valproic acid



Treatment of manic depression - lithium and anticonvulsant agents such as valproic acid

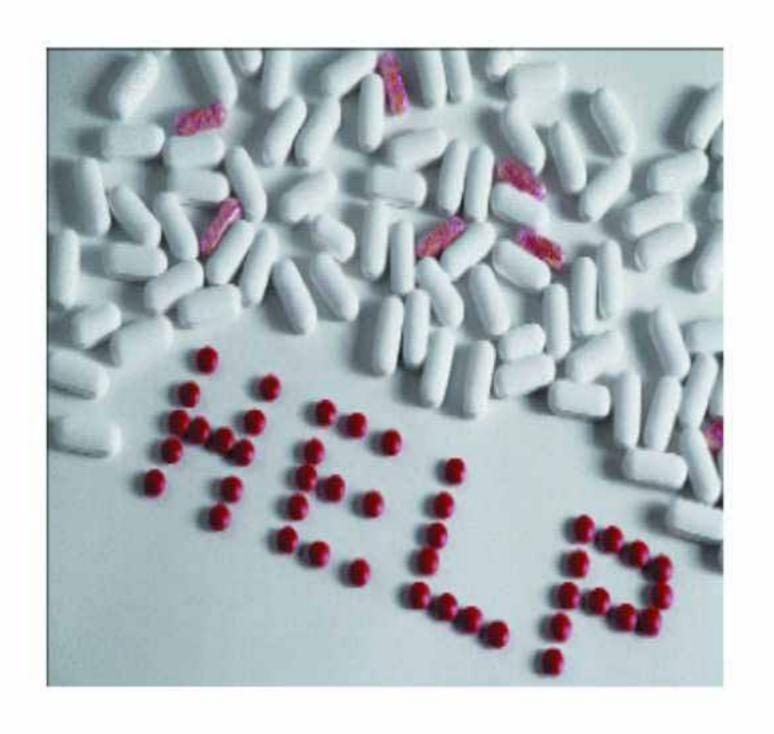
Future drugs may target brain sensitivity to hormones that trigger stress responses (such as corticotrophin releasing factor)



Trans-cranial magnetic stimulation (TMS) to stimulate happy thoughts



We take large amounts of anti-depressant medications!



We take large amounts of anti-depressant medications!

28 million people in the USA take anti-depressants



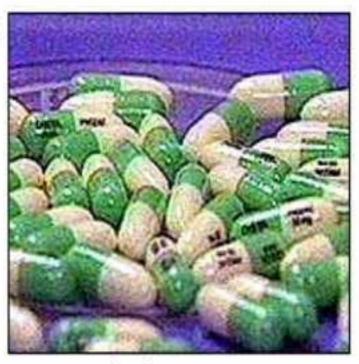
In the UK so many people are taking drugs like Prozac that it can even be detected in our drinking water!



### Prozac 'found in drinking water'

Traces of the antidepressant
Prozac can be found in the
nation's drinking water, it
has been revealed.

An Environment Agency report suggests so many people are taking the drug nowadays it is building up in rivers and groundwater.



Many people choose Prozac over other antidepressants

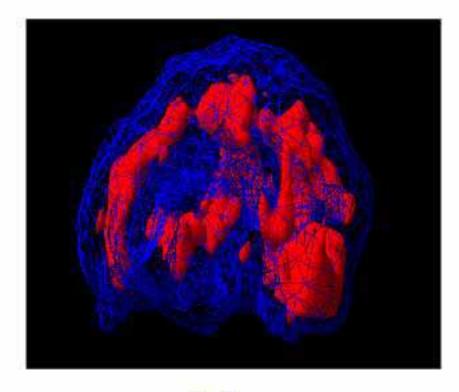
Herbal remedies - St John's Wort



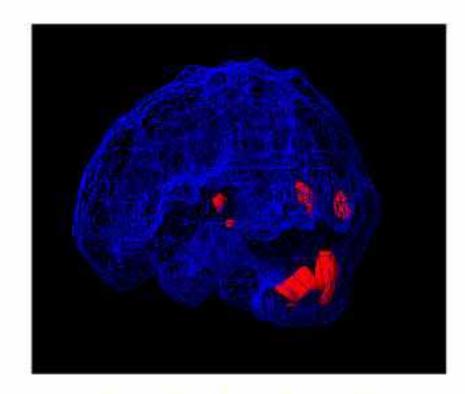


Herbal remedies - St John's Wort

Active ingredient is hypericin (900 - 1200 mg/day)



Before treatment



4 weeks treatment (900mg/day)

Single Photon Emission Computerized Tomography images (a nuclear medicine study that looks directly at cerebral blood flow )

# Why are women more prone to depression than men?





## Why are women more prone to depression than men?

Different gender roles and expectations - women are more involved in child care and domestic chores



Different gender roles and expectations - women are more involved in child care and domestic chores

Women tend to have expectations of lower achievement

and lower self-esteem...



Different gender roles and expectations - women are more involved in child care and domestic chores

Women tend to have expectations of lower achievement

and lower self-esteem...

...and a greater likelihood of experiencing psychosocial trauma



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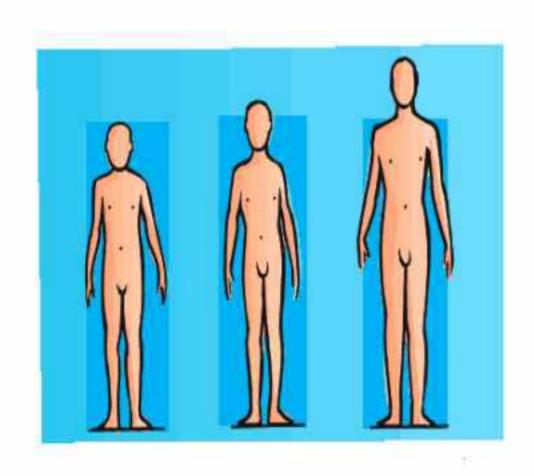
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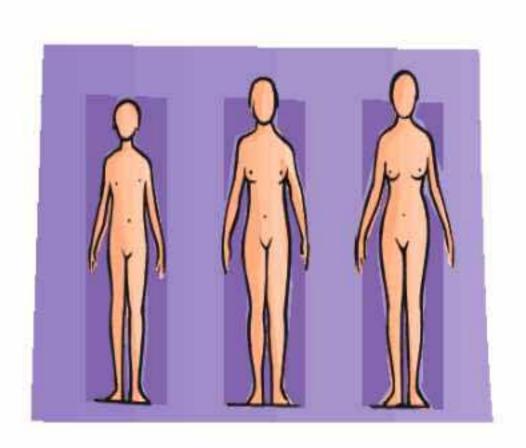
Females repeatedly mull over problems while men tend to try to engage in some form of action

Hormonal differences are still considered to be major contributors

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Sex differences in depression do not occur until the time of puberty and disappear in old age



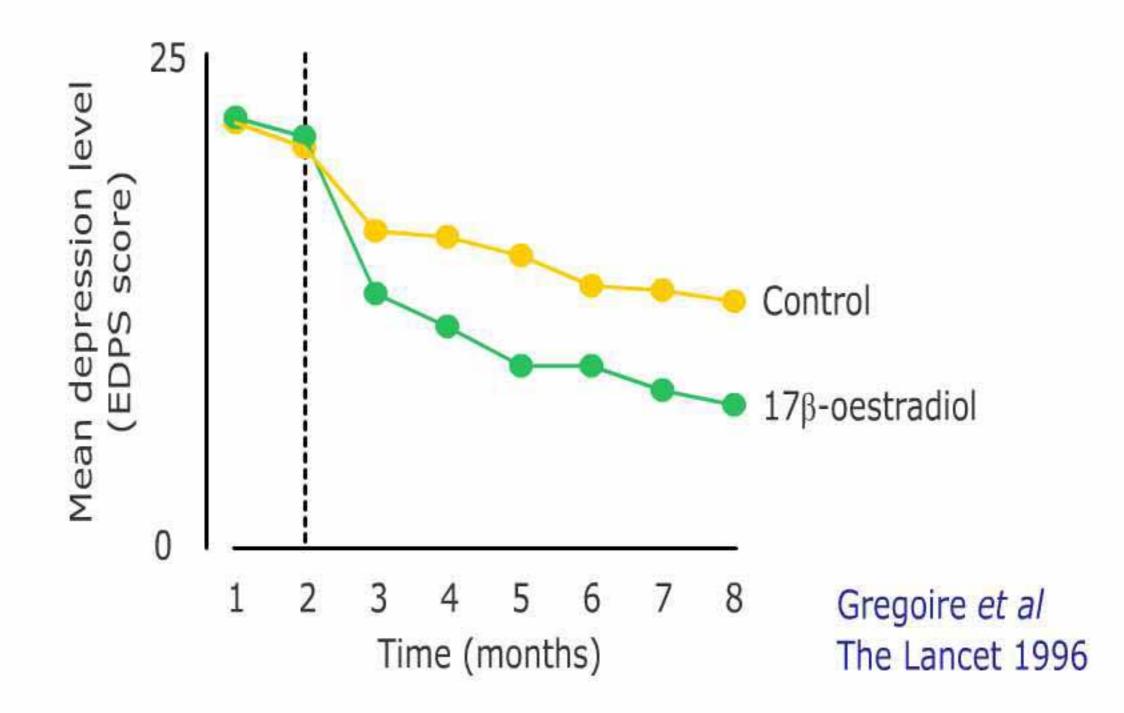


Hormonal differences are still considered to be major contributors

Sex differences in depression do not occur until the time of puberty and disappear in old age

Pre-menstrual syndrome, post-partum depression and menopausal-associated depression

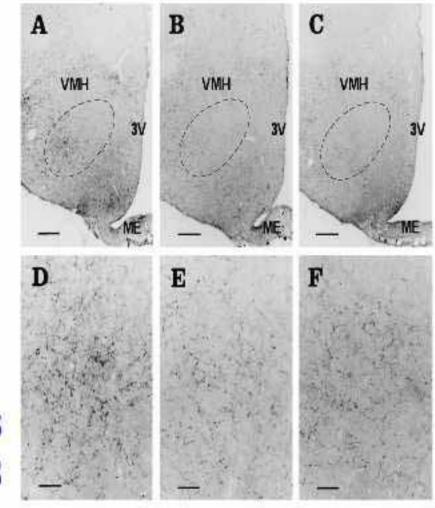
Oestrogen treatment can be as effective in reducing depression symptoms as SSRIs



Oestrogen treatment can be as effective in reducing depression symptoms as SSRIs

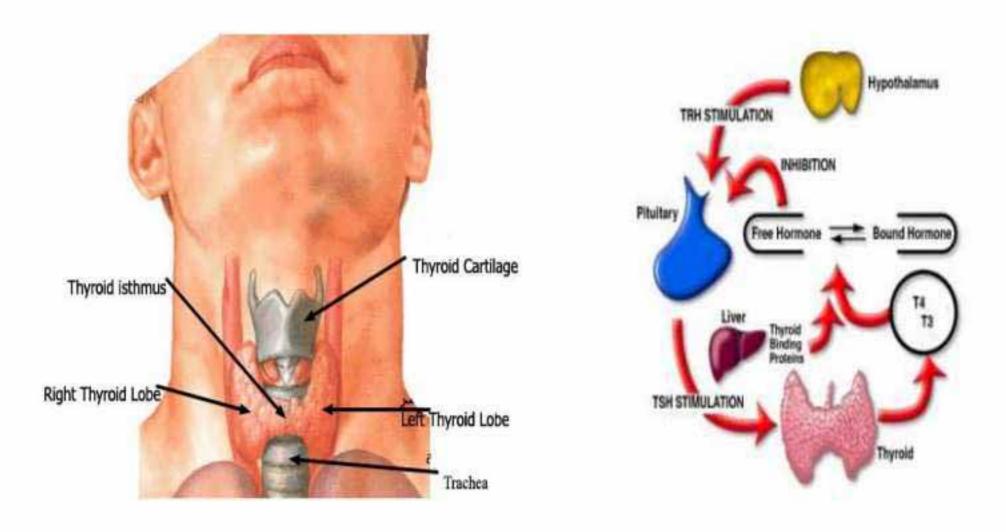
Oestrogen also increases activity in brain serotonin and

noradrenaline systems



Serotonin-immunoreactive fibers Lu *et al* J. Neuro 1998

Women are more prone than men to experience reduced thyroid gland activity



Thyroid hormones also act to boost brain serotonin and noradrenaline systems

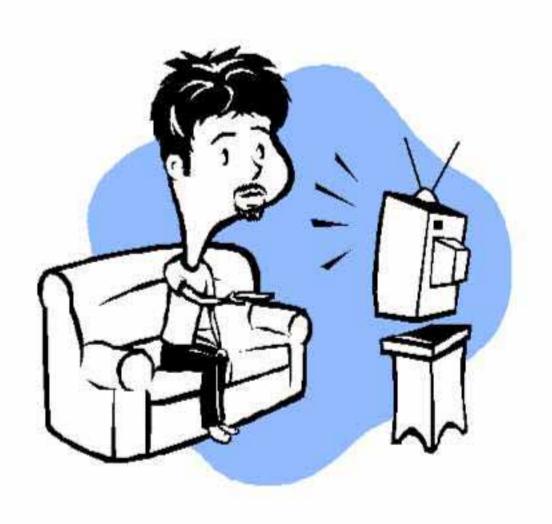
Step 1 - identify the causes

Step 2 – take positive action to solve problems

Step 3 – if not take steps to avoid them

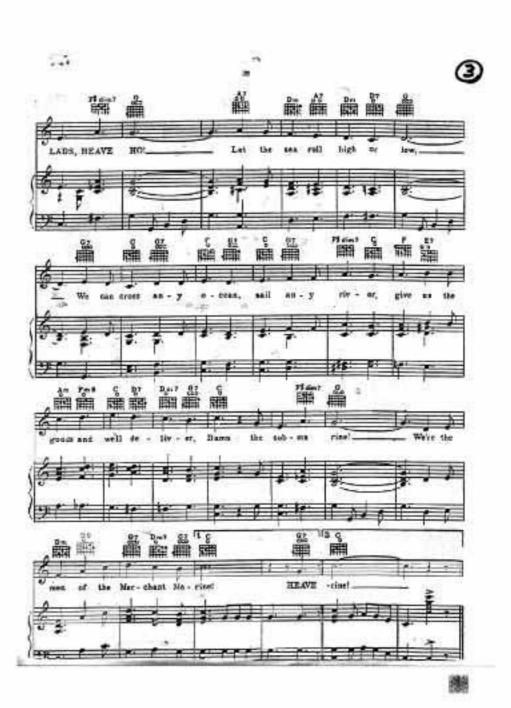
Coping strategies:

Watching TV



Coping strategies:

Watching TV Listening to the radio or music



Coping strategies:

Watching TV Listening to the radio or music Reading



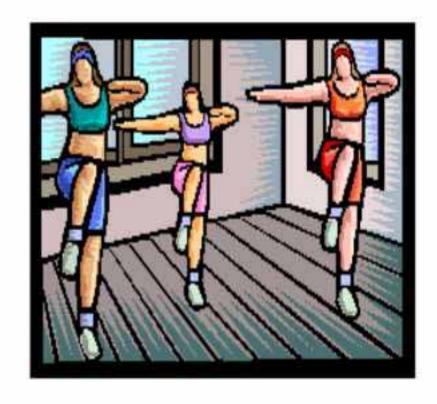
#### Coping strategies:

Watching TV
Listening to the radio or music
Reading
Socialising



#### Coping strategies:

Watching TV
Listening to the radio or music
Reading
Socialising
Exercising



#### Coping strategies:

Watching TV
Listening to the radio or music
Reading
Socialising
Exercising
Relaxation/meditation



More dangerous remedies include:

Smoking



More dangerous remedies include:

Smoking Drinking alcohol



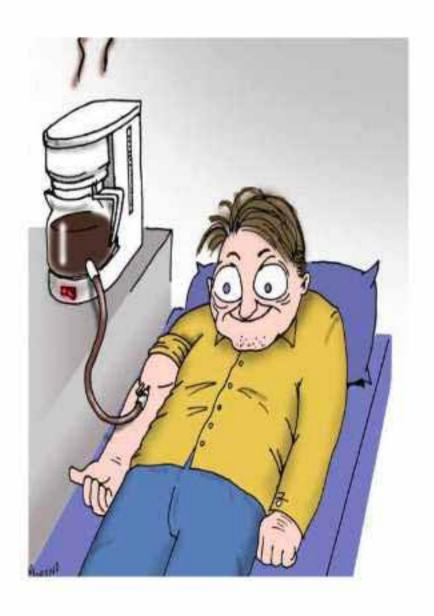
More dangerous remedies include:

Smoking Drinking alcohol Eating



More dangerous remedies include:

Smoking
Drinking alcohol
Eating
Caffeine and sugar

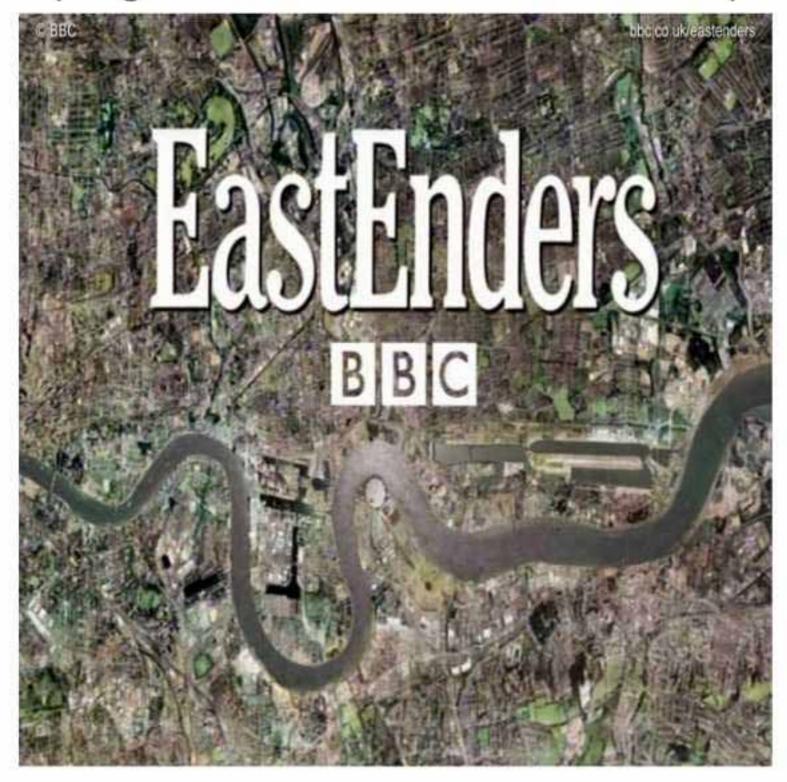


More dangerous remedies include:

Smoking
Drinking alcohol
Eating
Caffeine and sugar
Recreational drugs



Watching TV programmes can contribute to depression



Watching TV programmes can contribute to depression

Listening to sombre music can do the same



Leonard Cohen

## Active and passive coping strategies

# Best coping strategies involve action



#### Active and passive coping strategies

Best coping strategies involve action

Animals suffering social defeat will survive if they keep active



#### Active and passive coping strategies

Best coping strategies involve action

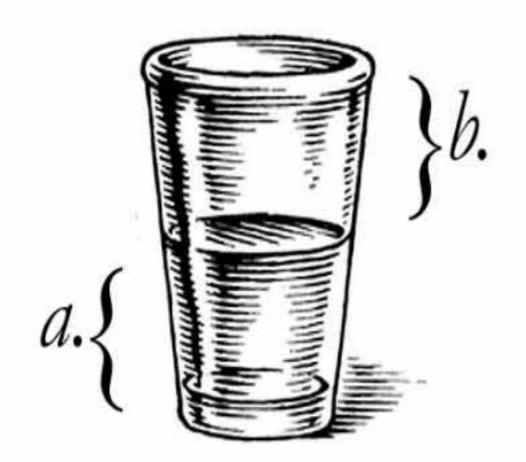
Animals suffering social defeat will survive if they keep active

Most popular human coping strategies are passive and only short term fixes

#### Seeing the glass half-full rather than half-empty

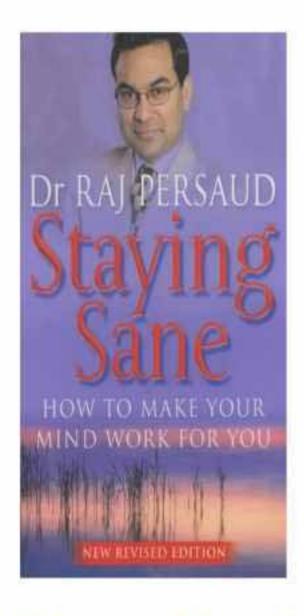
The way we perceive challenges in life is a major focus for helping us cope

Trying to seeing things in a positive rather than a negative light is essential

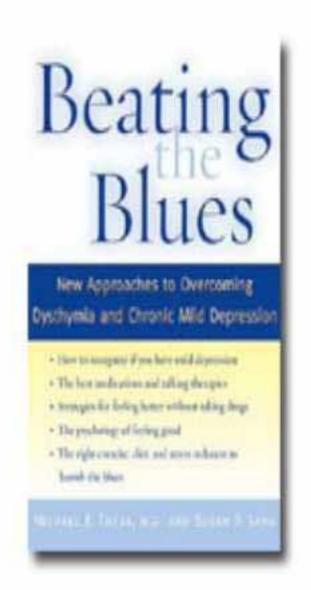


#### Seeing the glass half-full rather than half-empty

#### Books for positive self-help strategies



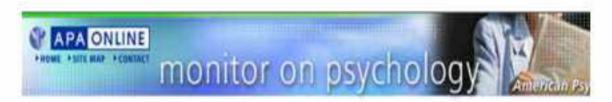
'Staying Sane' by Raj Persaud



'Beating the Blues' by Thase and Lang

# Just being with another familiar calm individual can help alleviate stress and anxiety





Volume 35, No. 8 September 2004



Science watch

#### Buddy system eases stress, study suggests

Japanese study highlights health value of company, even in the face of literal shock.

BY RACHEL ADELSON Print version: page 24

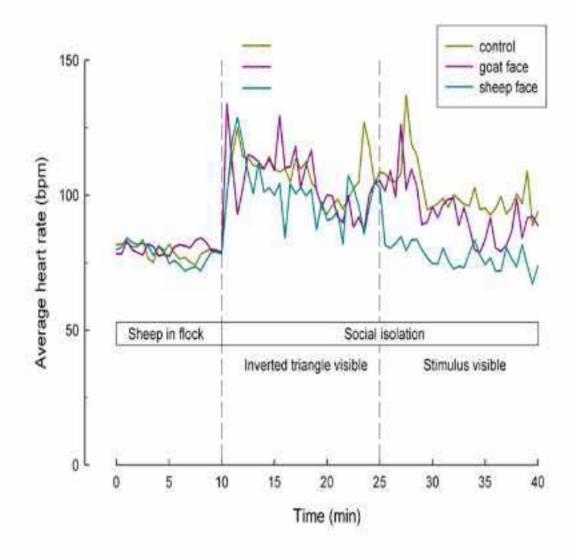
"Social companions seem to help with recovery, which seems to fit what clinicians think about trauma, stress and

Misery loves company for reasons science is beginning to understand. Researchers at the University of Tokyo used three different measures to confirm that the mere presence of a partner alleviated the stress response in rats, reducing stress-induced behaviors such as "freezing," helping them to literally keep their cool, National Institute of and staving off high levels of stress-related brain chemicals.

social support."

Just being with another familiar calm individual can help alleviate stress and anxiety

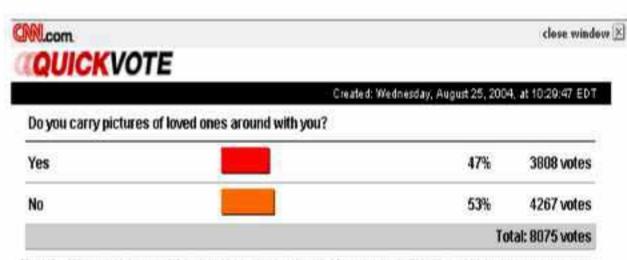
Just seeing a picture of a familiar face can be enough





#### The picture in your wallet





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#### Related:

Sheep put brave face on stress

# Separation anxiety





Separation anxiety

Positive social interactions are widely recognised as a way of reducing stress

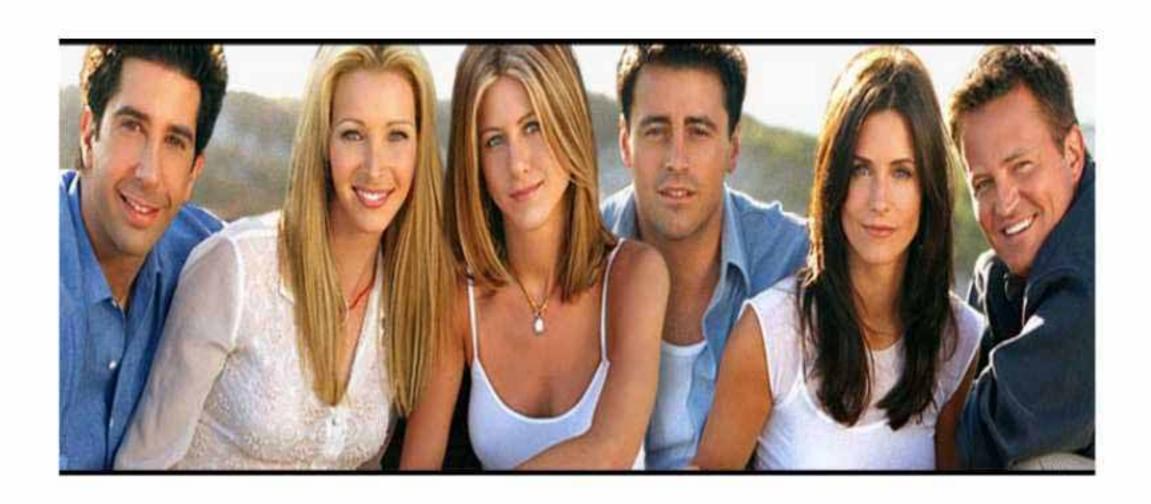
which image from buddy talk?

Separation anxiety

Positive social interactions are widely recognised as a way of reducing stress

Solitary individuals more prone to stress, anxiety and depression

Seeking out good, calm friends works better for men than women



Seeking out good, calm friends works better for men than women



## Exercise

Taking regular exercise is highly effective in alleviating symptoms of stress, anxiety and depression



## Exercise

Any form of regular (perhaps 5 x 30 min sessions a week), relatively vigorous activity



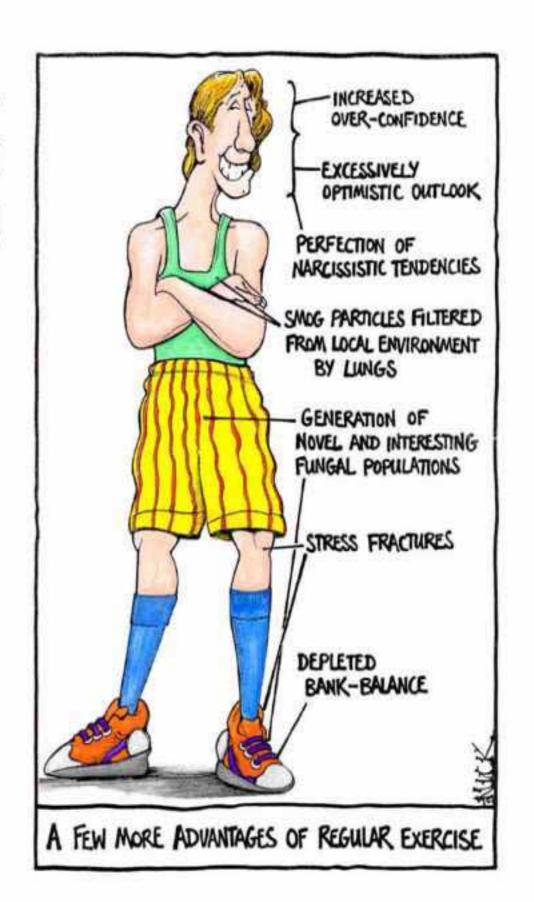






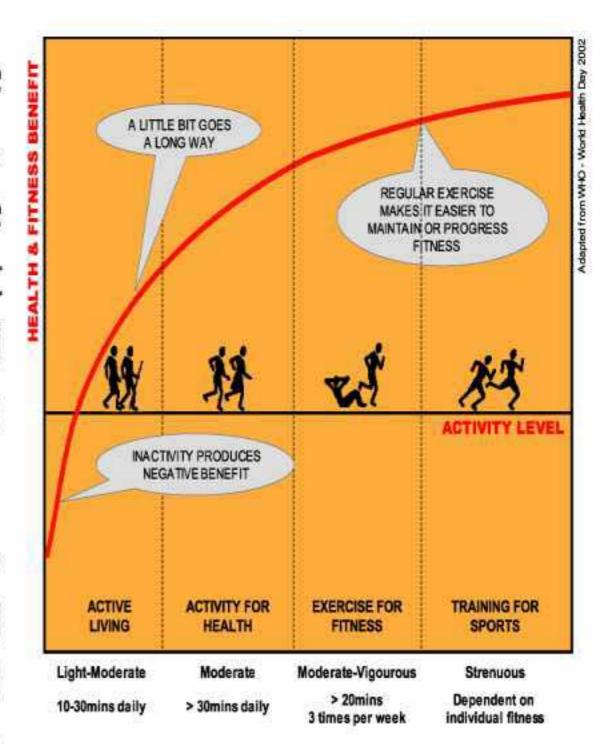


Releases endorphins, adrenaline, serotonin and dopamine in the brain which promote a sense of well-being



Physical health can also be promoted – weight reduction, improved flexibility and muscle tone, reduced risk of heart disease, cancer, high blood pressure, osteoporosis, diabetes

Relieves tension, frustration, stress and anxiety by changing heart rate, oxygen intake and stimulating biochemical changes



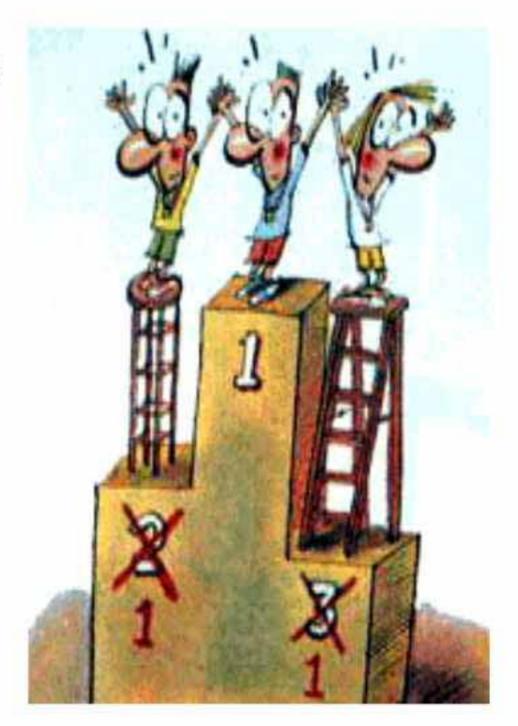
May also increase social interactions

- eg going to leisure centers



May also increase social interactions – eg going to leisure centers

Boosts sense of achievement and heightens self-esteem



May also increase social interactions

eg going to leisure centers

Boosts sense of achievement and heightens self-esteem

Distracts you from mulling over problems



May also increase social interactions – eg going to leisure centers

Boosts sense of achievement and heightens self-esteem

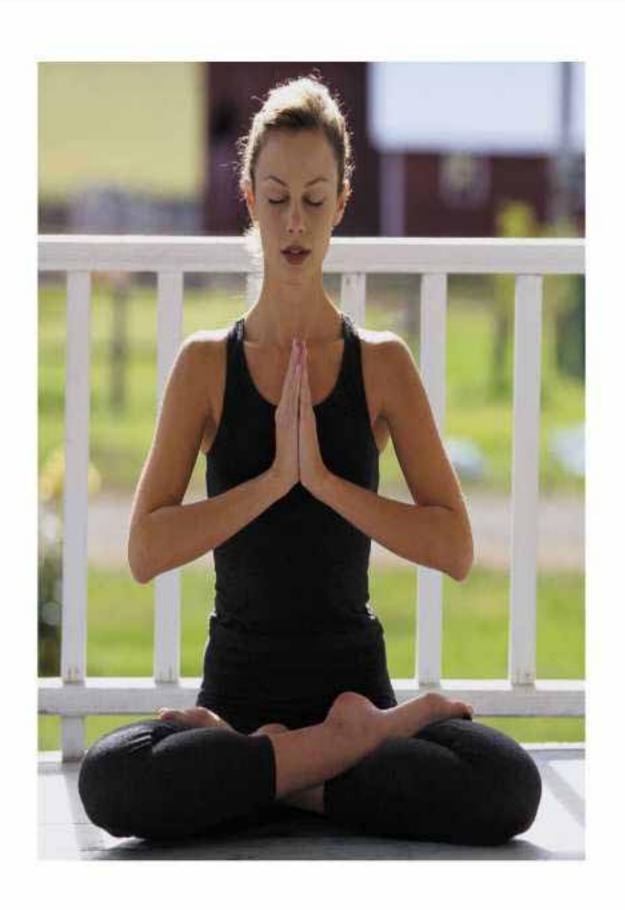


Distracts you from mulling over problems

Improves sleep quality – by stimulating muscles, lungs, heart rate, oxygen intake and biochemical changes

# Relaxation techniques and meditation

Mind - Body exercises



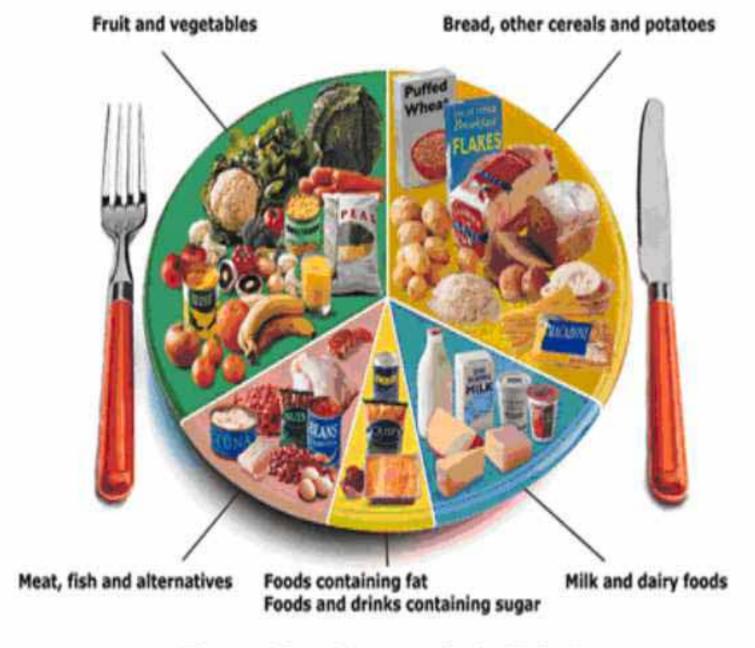
# Relaxation techniques and meditation

Mind – Body exercises

Yoga, Tai-Chi, Pilates and Meditation, and breathing control techniques



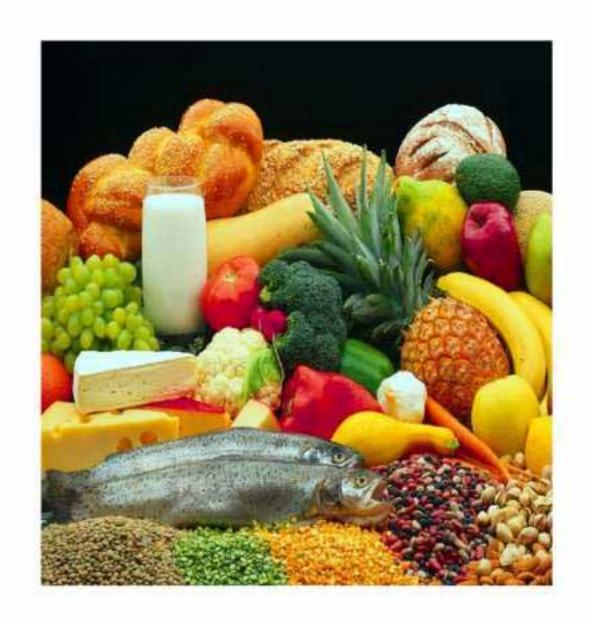
Maintaining a good diet will help counter effects of stress, anxiety and depression



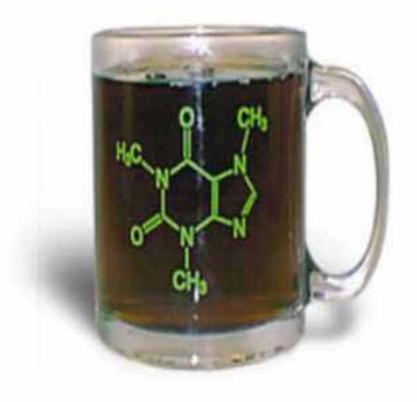
There are five main groups of valuable foods

Maintaining a good diet will help counter effects of stress, anxiety and depression

Plenty of fresh vegetables, fresh fruits, whole grain breads and cereals, fibre, B-complex vitamins, iron, proteins and recommended daily intake of other vitamins and minerals



# Caffeine and sugar are double-edged swords



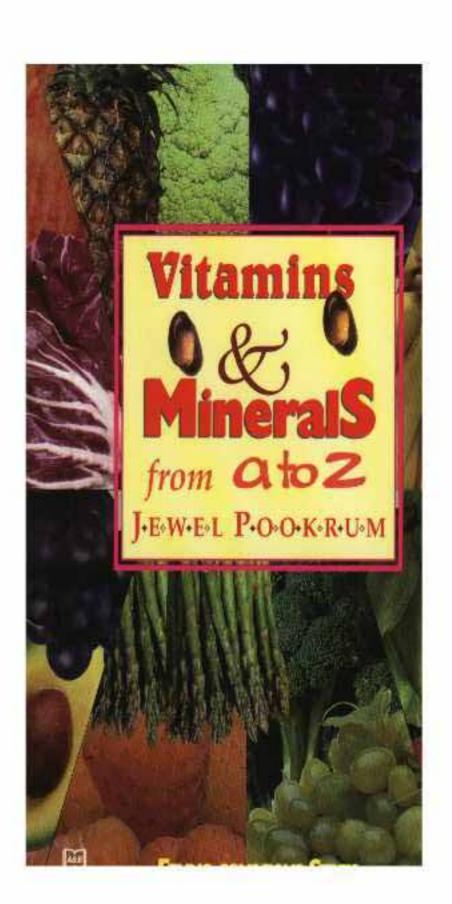


Caffeine and sugar are double-edged swords

Comfort eating and drinking – only short-term fixes for stress and anxiety



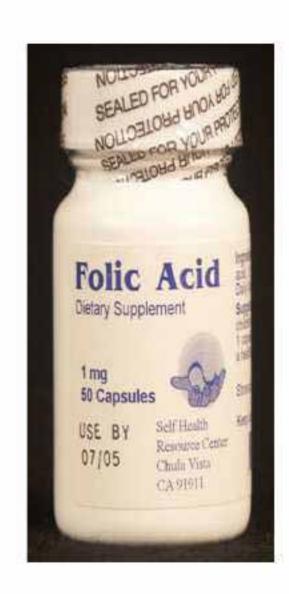




Low levels of B vitamins are linked with depression

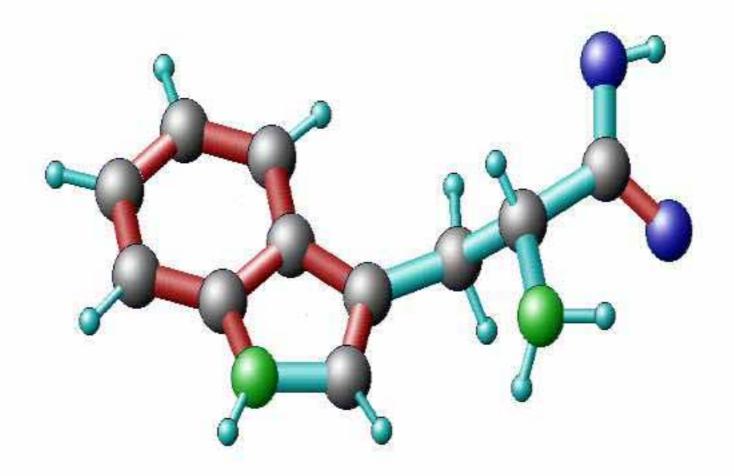
- B6, B12, folic acid

Recommended remedial dose of folate is 400-800 mg/day



Tryptophan (a serotonin precursor) may also be beneficial

- high carbohydrate/high protein foods



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Omega-3 fatty acids help maintain healthy brain cells

- tuna, salmon, fish oil and flaxseed



Traumatic early life experiences have long-term consequences for levels of stress, anxiety and depression



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Animal studies show strong influence of presence and type of parental care

Monkeys raised in juvenile groups leads to greater incidence of stress and alcohol addiction

Children raised in institutions?

Children of high-achiever or high anxiety/depression-prone parents

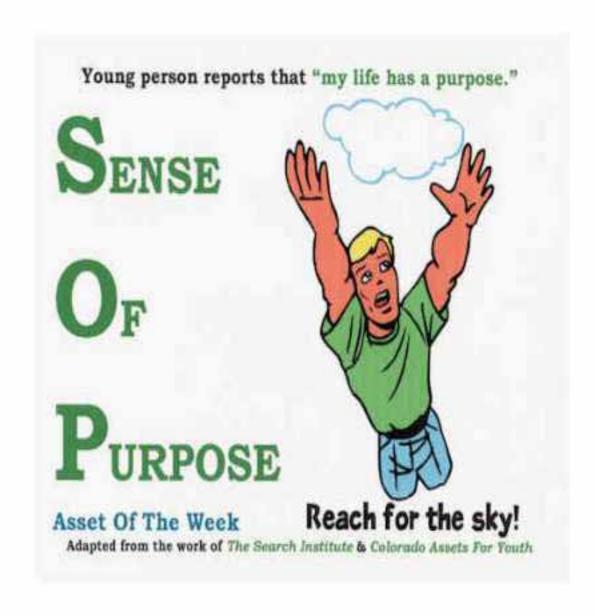
Working parents may not provide sufficient reinforcement for use of social buffering

Importance of positive physical contact?

The issue is not about parents being overprotective and preventing any stress

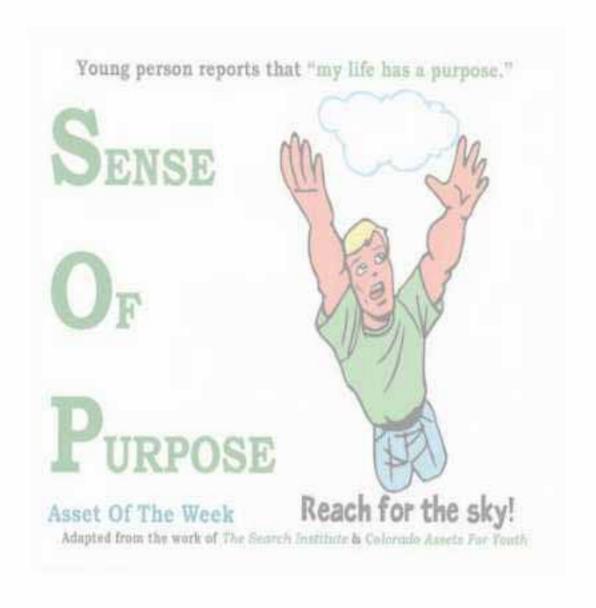
It's being available and providing positive social support when it happens!

Having a strong sense of purpose is a buffer against pretty much anything life can throw at you



Having a strong sense of purpose is a buffer against pretty much anything life can throw at you

In modern materialistic cultures it may be weak and easily undermined



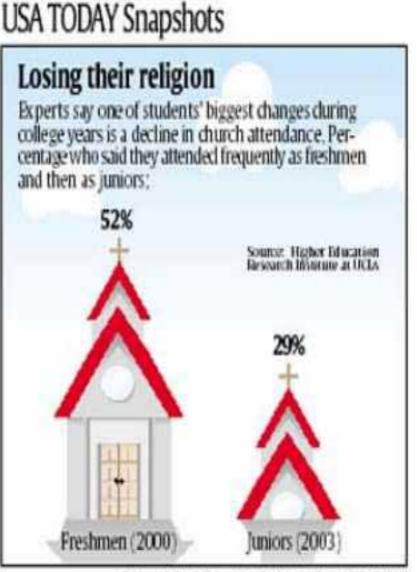
Individuals with strong religious convictions have less

anxiety and depression problems



Individuals with strong religious convictions have less anxiety and depression problems

In many cultures religion is in serious decline

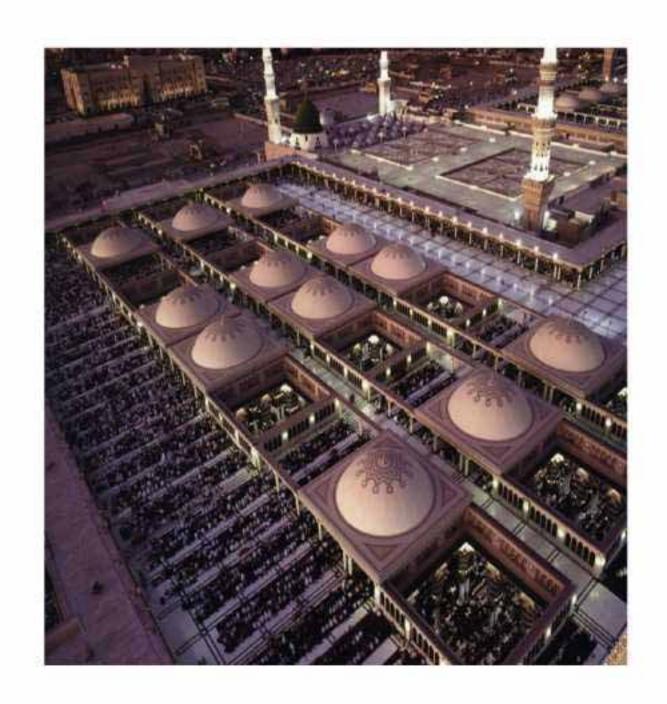


By Joseph Popioliowski and Adrienne Lewis, USA TODAY

Individuals with strong religious convictions have less anxiety and depression problems

In many cultures religion is in serious decline

Islamic Fundamentalism?



The negative impact of uncontrolled stress, anxiety and depression is growing

We cannot simply get rid of them since they have important survival value

Chronic stress damages most bodily and mental functions

Constant anxiety and depression also damage bodily and mental functions

Early life experiences may have the major impact on susceptibility

There are many effective drug treatments for serious anxiety and depression

They do have potential side effects and may have to be taken for life

Since conditions are progressive it is important to deal with them early

Use active coping strategies: maintain positive attitudes, friends who are positive and listen, regular exercise, relaxation/meditation and good diet

Try not to get stressed out during pregnancy

Parents should try to be there more for their children

# Develop a strong sense of purpose

