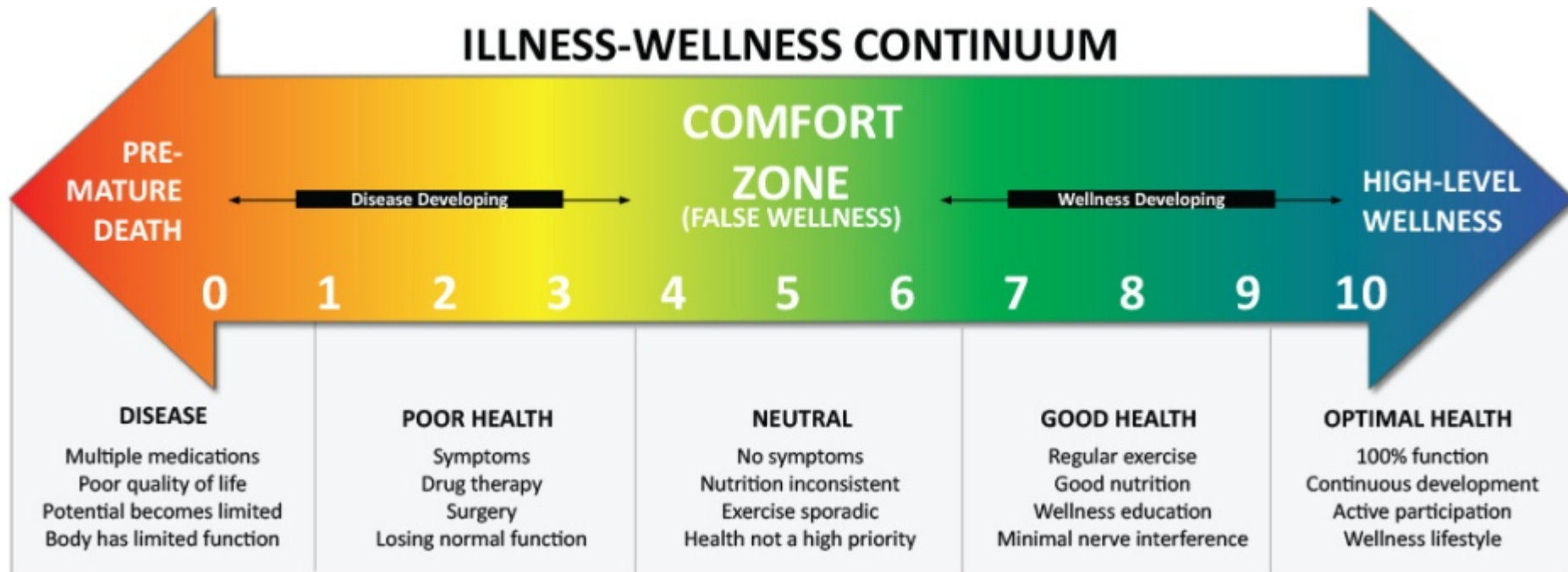


Health Defined

Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity

WHO



Recommendations for Healthy Living

- Making “good” healthy life choices
- Not smoking
- Having a maximum body mass index (BMI) of less than 25 kg/m²
- Engaging in daily moderate and weekly vigorous physical activity
- Regular balanced diet, including,
- Reducing Physiological and Psychological stress
- Having regular medical health checks

Life Style

Diet



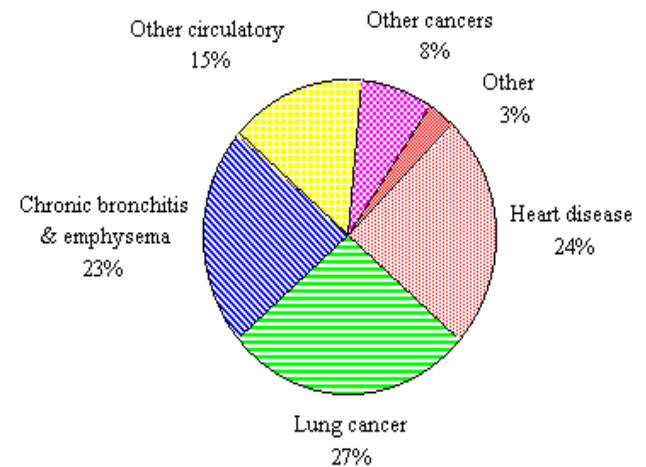
Activity

© 1999 Randy Glasbergen. www.glasbergen.com



**"You'll lose weight on any strict diet,
but it's mostly water...from crying."**

Figure 3.1: Proportion of deaths from smoking by disease group



Source: compiled from English and Holman et al.⁴

Choice
s

Stress

Stress Reduction Kit



Directions:

1. Place kit on FIRM surface.
2. Follow directions in circle of kit.
3. Repeat step 2 as necessary, or until unconscious.
4. If unconscious, cease stress reduction activity.

AHAJOKES.COM

Individual Factors Affecting Health

- Diet
- Exercise – Overtraining – Injury
- Stress & mental health
- Sleep
- Illness
- Work
- Personality
- Personal organisation
- Alcohol & substance misuse
- Regular health / fitness checks

Life Choices – e.g. Smoking

- 1.Heart attacks (coronary thrombosis or myocardial infarct);**
- 2.Angina;**
- 3.Hardening of the arteries;**
- 4.Blockage of the blood vessels leading to the feet, causing poor circulation and sometimes gangrene;**
- 5.Impotence;**
- 6.Stroke;**
- 7.Kidney trouble;**
- 8.High blood pressure;**
- 9.Lung cancer; Cancer of the mouth, throat, cervix;**
- 10.Smoker's lung - long term inflammation of the air passages;**
- 11.Chronic obstructive pulmonary disease ('Obstructive Airways Disease');**
- 12.Ulcers and indigestion.**
- 13.Loss of eye sight**

Sleep

- Need 7-8 hours per night
- During sleep the brain forms pathways necessary for learning and creating memories and new insights.
- Without enough sleep, you can't focus and pay attention or respond quickly.
- A lack of sleep may cause mood problems.
- Growing evidence shows that a chronic lack of sleep increases the risk for developing obesity, diabetes, cardiovascular disease, and infections.

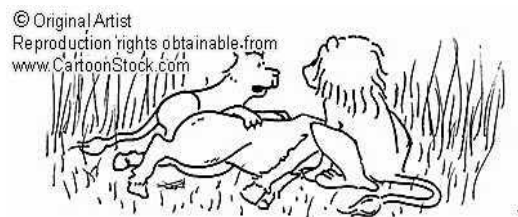
Dietary Concerns

- Obesity
- Anorexia
- Coronary Heart Disease
- Hypertension (cardiovascular stress)
- Depression
- Joint disorders / concerns
- Illness such as diabetes, asthma, cancer

Recommendations



5+ portions per day



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"I wonder if we're getting enough fibre?"

5+ portions per day



2-4 servings per day

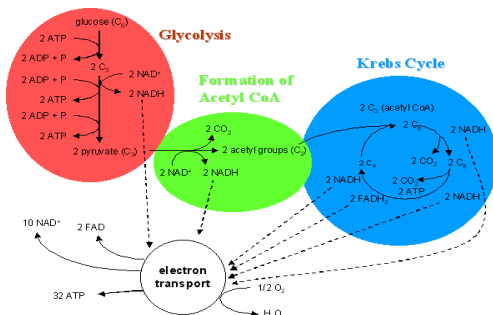
Recommendations



1.0 g / 2.0 per kg body weight



3-4 lts per day

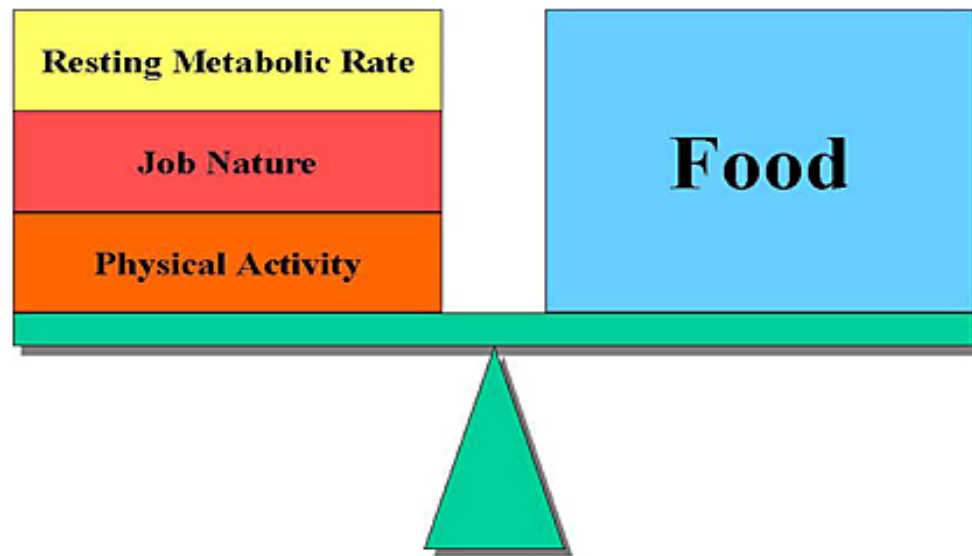


25 – 40 kcals per kg per day

Other requirements

- Vitamins
- Mineral
- Low sodium
- Low caffeine
- Low alcohol
- Reduced saturated fat
- High anti-oxidants low free radicals
- Do not fry foods
- Steam rather than boil

Activity



Resting metabolic rate



- The amount of energy required to fulfil all body functions whilst at rest
- Approximately 0.02 kcal/kg/min

Work energy requirements

- Sleeping 0.01 kcal/kg/min
- Cooking 0.045 kcal/kg/min
- Office work 0.028 kcal/kg/min
- Moderate activity 0.1kcal/kg/min

Recreation energy requirements

- Aerobics 0.105 kcal/kg/min
- Running 0.23 kcal/kg/min
- Swimming 0.15 kcal/kg/min
- Football 0.132 kcal/kg/min

Activity recommendations

Health benefits have been shown to come from

- 150 minutes per week
- >10 mins per session



Additional exercise may improve fitness but not induce further health benefits

Stress

- “The way in which we perceive and react to the environment in which we live”?
- Psychological
- Physical
- Psychosomatic

Manifestations of Stress

- Anxiety / depression
- Illness
- Lack of concentration
- Fatigue
- Headaches
- Heart stress
- Ulcers
- Eczema

Illness

“a state of poor health and is sometimes considered a synonym for disease”

Or as others maintain that fine distinctions exist.

Some have described illness as the subjective perception by a patient of an objectively defined disease. (McWhinney.IR.,1987).

Disease

*'a disorder or malfunction of the mind or body,
which leads to a departure from good health.'*



Single cause - Can be a disorder of a **specific tissue** or **organ**
e.g. Infections

Multifactorial e.g. Heart disease.

Cause of a Cause e.g. Obesity

Illness v Disease

Acute Disease



Illness



Sudden On-set

Symptoms disappear quickly

Flu

Cold

Cellulitis

Chronic Disease



Long term

Type 2 diabetes

Gestational Diabetes

Permanent

Type 1 Diabetes

Categories of Diseases

Physical

Degenerative

Mental

Deficiency

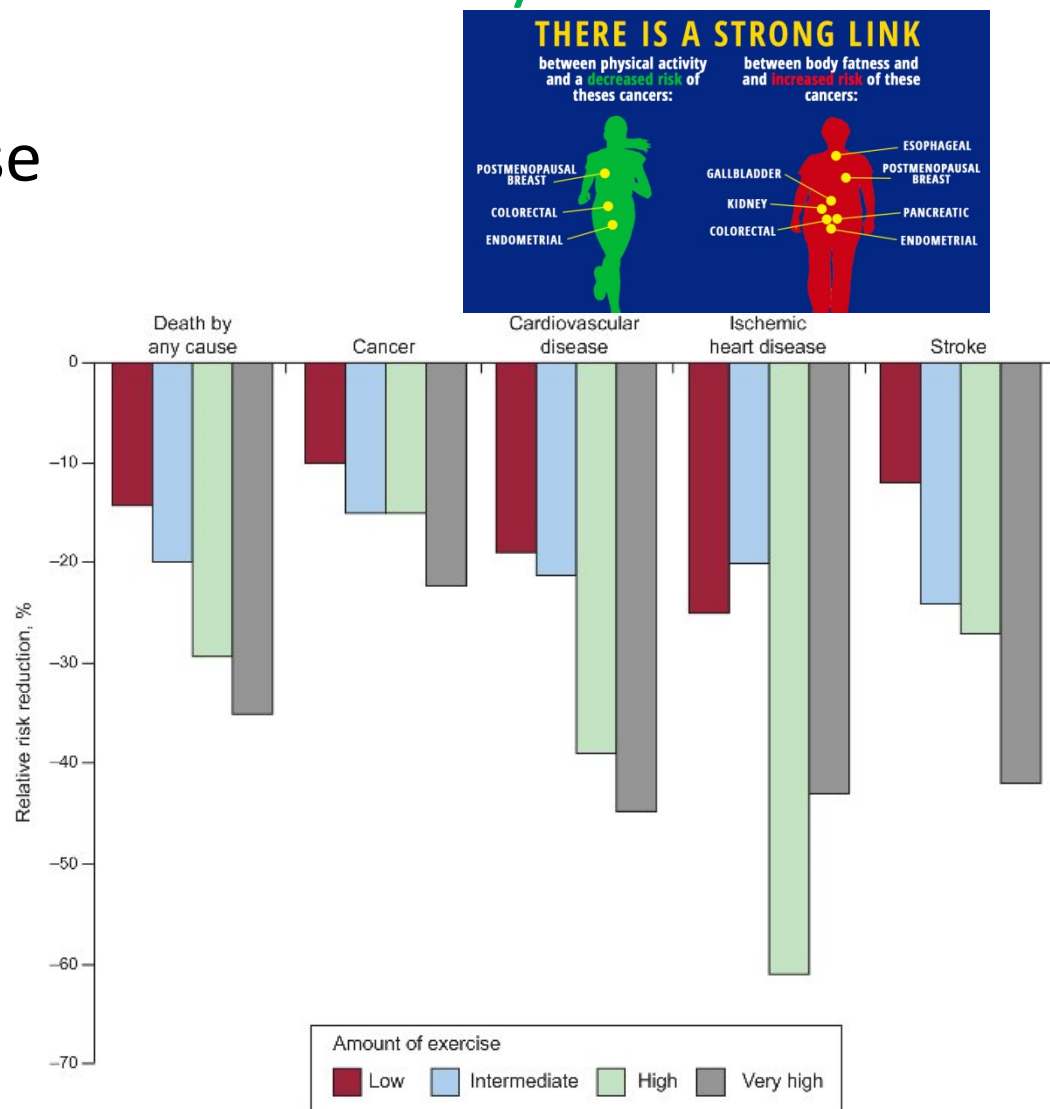
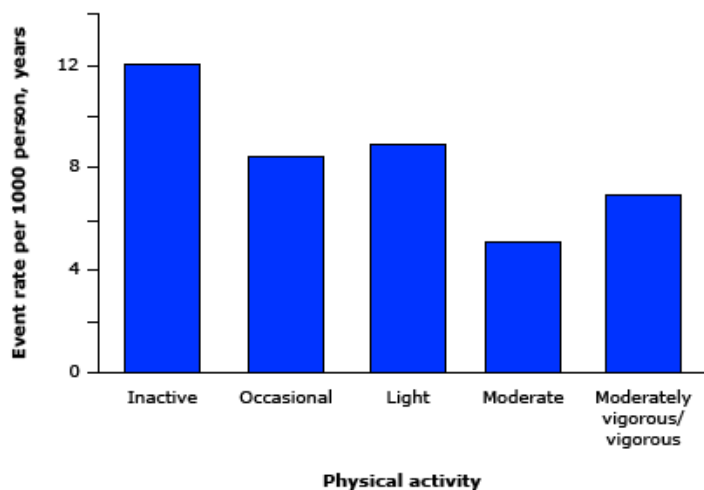
Infectious

Social

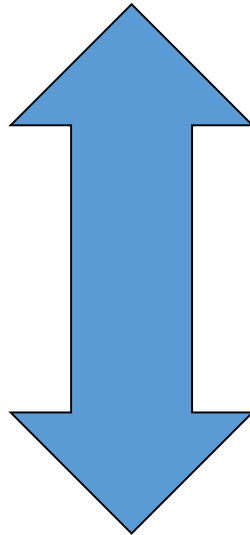
Physical

Results from permanent or temporary damage
Physical disease to the body.

- Coronary heart disease
- Cancer
- Stroke
- Diabetes



Mental Health Conditions



Physical Health Conditions

Mental Health Diseases

A disease that affects a person's mind

Thoughts, emotions, memory and personal and social behaviour

1. May have physical symptoms.
2. May have psychosomatic symptoms

Phobias

Mania ↔ Depression

Stress ↔ Anxiety

6 Mental Health Benefits of Exercise

1

Boosting Happy Chemicals

When you exercise, your body releases chemicals called endorphins. Endorphins trigger a positive feeling in the body.

2

Helps with Anxiety

Exercise is a natural and effective way to help with anxiety.

3

Reduces Stress

Exercise is a fantastic way to reduce stress as it helps to relax the muscles and relieve tension in the body.

4

Better Sleep

According to research, exercising consistently can lead to improvements in sleep over time, but not immediately.

5

Improves Self-Confidence

Working out can be a great way to boost your confidence, not only will you feel better but seeing your body change will do wonders to your confidence.

6

Improves Work Flow

Multiple studies have shown the positive effect that exercise has on productivity, so get more work done today by incorporating exercise into your life.

Deficiency & Toxicity disease

Associated with malnutrition & lack of exercise

- Scurvy – vitamin C
- Night blindness – vitamin A
- Rickets – vitamin D
- Iron deficiency anaemia
- Demineralisation
- Sunlight

Associated with Hyper-nutrition & Too of exercise

Injury

Fatigue

Over training

Hypertension

Haemochromatosis

Gall stones

Degenerative Diseases

Ageing

Long term inactive

Chronic illness

Malnutrition

Sarcopenia

Detraining

Cachexia

Malnutrition – Sarcopenia syndrome

A gradual loss of function in one or several organs or tissues can occur (associated with a progressive destruction of specialised cells) in youth or middle age



1. Immune system attack its own cells e.g. Rheumatoid arthritis
2. Deficiency in childhood which leads to degeneration later in life e.g low vit D and calcium increases risk of osteoporosis.

Infectious diseases

Organisms that cause disease inside the human body are called **pathogens**.

Bacteria and Viruses are the best known pathogens.

Fungi, protists and parasites can also cause disease

Diseases are said to be infectious or communicable if pathogens can be passed from one person to another.

Social Factors

Standard of housing – overcrowding/unhygienic

Environmental factors such as levels of pollution and
Purity of water supply

Lack of food – deficiency diseases

Excess of food – diseases associated with obesity
And cardiovascular disease

Occupation

Exposure and/or abuse of drugs

Gene Mutations

- Mutations of the DNA leading to changes in cell and organ function as a result of;
 - Hereditary
 - lifestyle
 - Environment
 - Luck!

Adaptation

1. Stimulus
2. Produces signalling molecule
3. Attaches to cell membrane or enters cell
4. Affects gene expression
5. Changes production of protein structures
6. Changes functionality

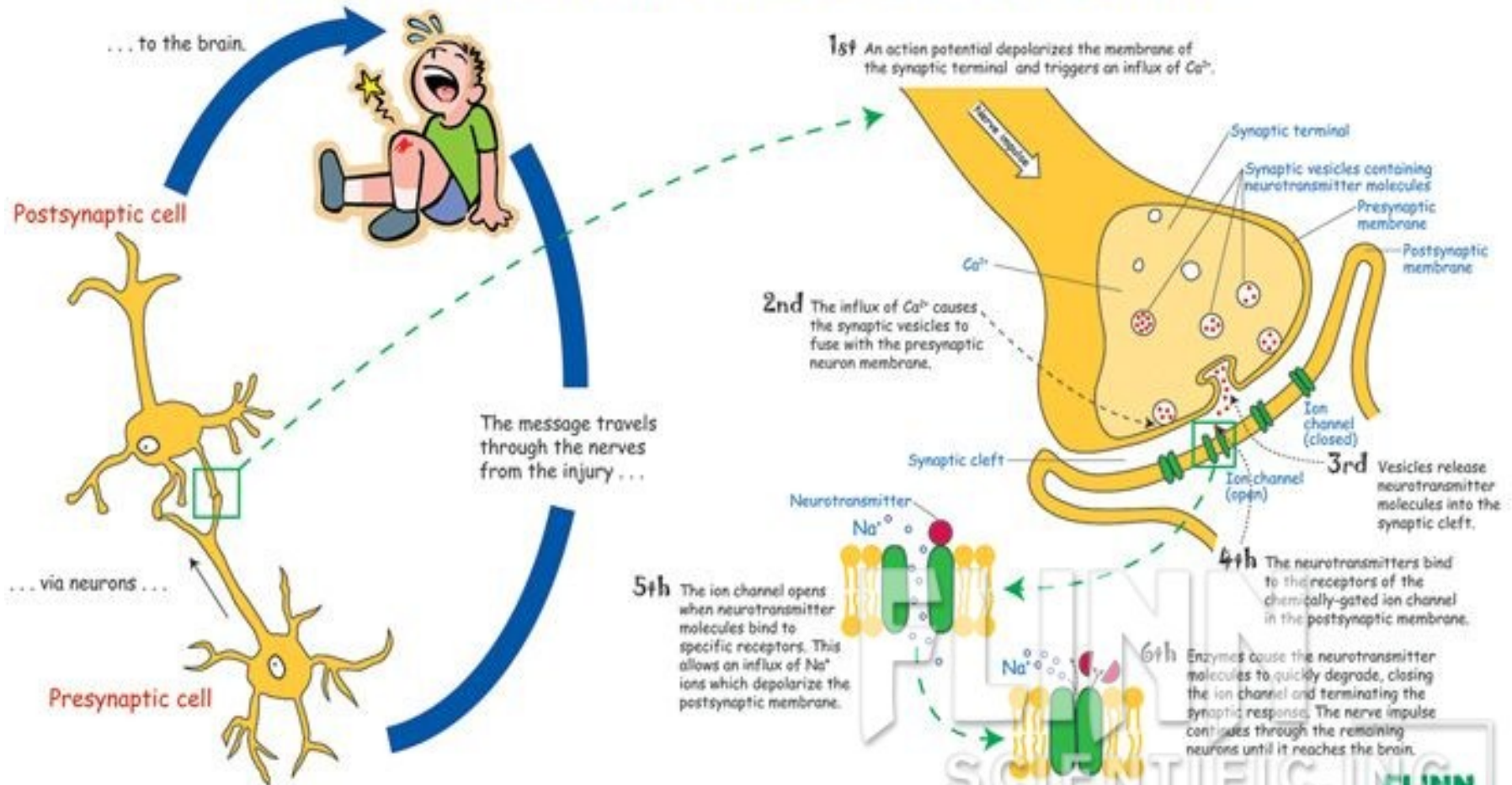
Strength training cause micro-trauma in bone tissue releasing factors around bone osteocytes

These factors stimulate highly specific regions on a specific gene which causes the cell to replicate, thereby increasing body density.

If stimulus does not occur or nutrients are deficient then the stimulus is to reduce production of a structure and we get deterioration.

Cell Signaling

How does the brain receive the message when the body is injured?



Intercellular Communication

- Markers – identify cell type for other cells
- Receptors – receive signals from other cells and bind certain specific substances.
- Activators – send signals to other cells

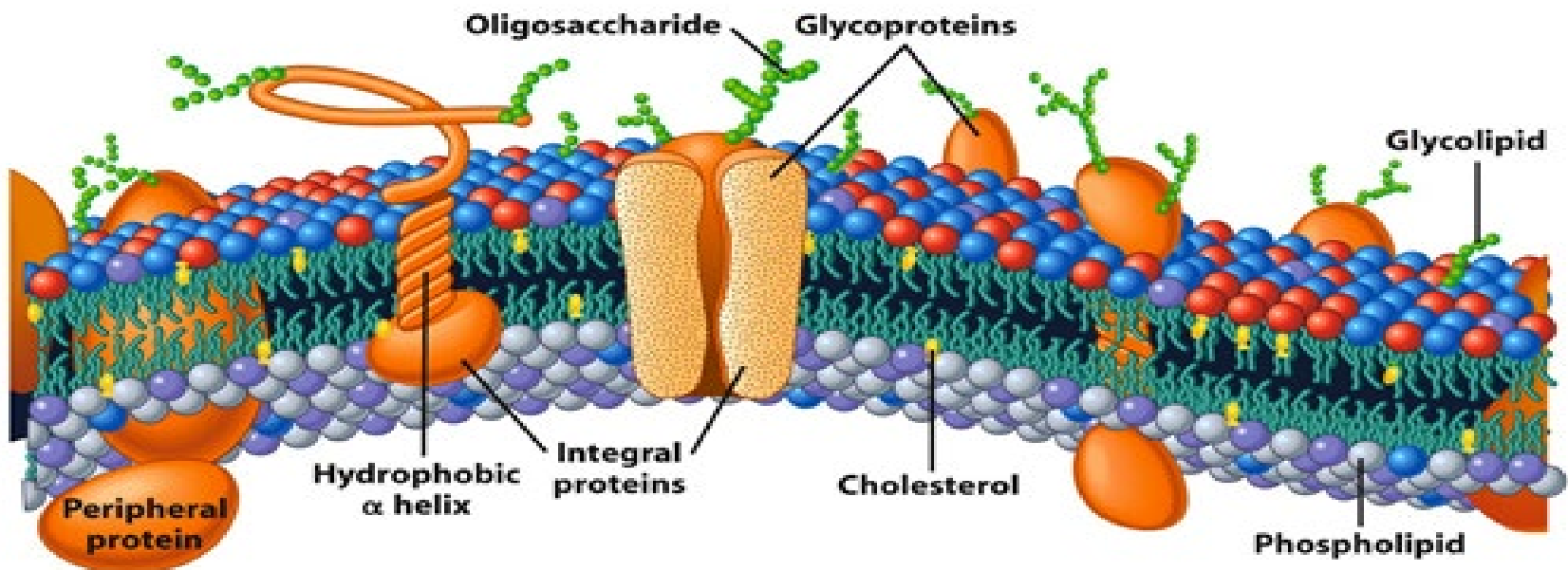


Figure 4-4c Cell and Molecular Biology, 5/e (© 2008 John Wiley & Sons)

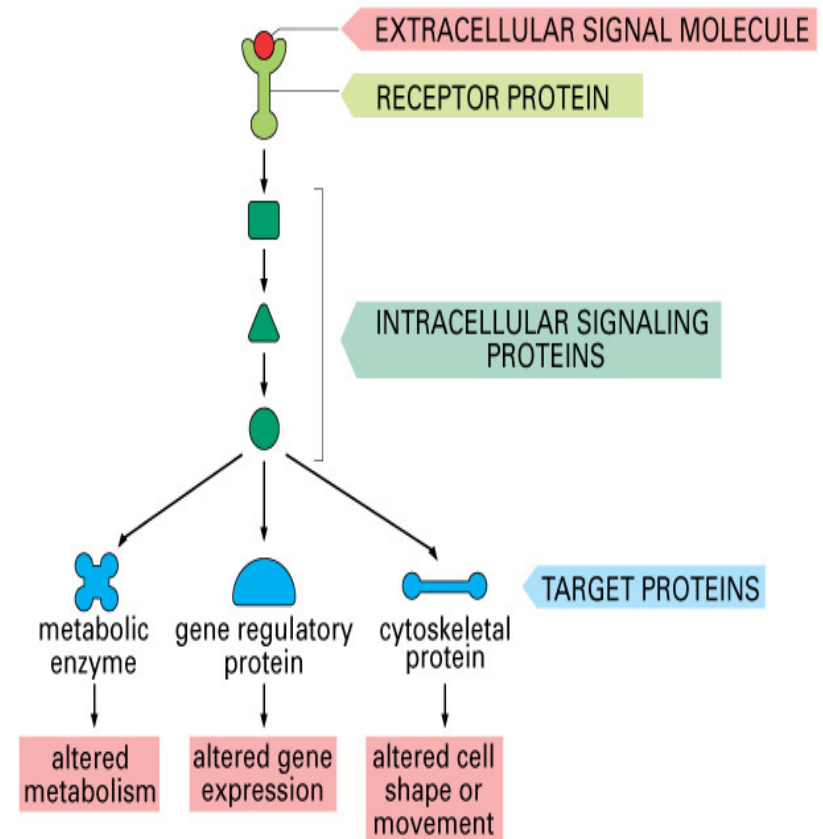
Cell & Cell to cell signalling

- **Intracrine** signals are produced by the target cell that stay within the target cell.
- **Autocrine** signals are produced by the target cell, are secreted, and effect the target cell itself via its own receptors receptors. Sometimes autocrine cells can target cells close by if they are the same type of cell as the emitting cell. An example of this are immune cells.
- **Juxtacrine** signals target adjacent (touching) cells. These signals are transmitted along cell membranes via protein or lipid components integral to the membrane and are capable of affecting either the emitting cell or cells immediately adjacent.
- **Paracrine** signals target cells in the vicinity of the emitting cell. Neurotransmitters represent an example.
- **Endocrine** signals target distant cells. Endocrine cells produce hormones that travel through the blood to reach all parts of the body.

Intracellular Signaling Pathways

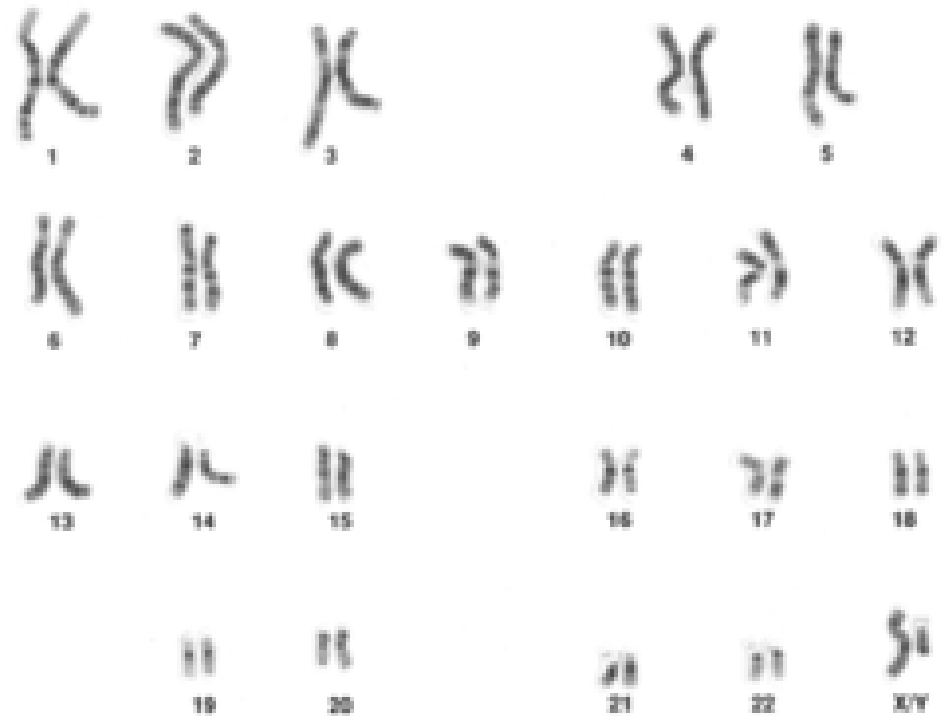
The same receptor molecule can interact with many intracellular relay systems so same signal & same receptor may have different effects in different cells

Same relay system many act on many different intracellular targets



The Genome

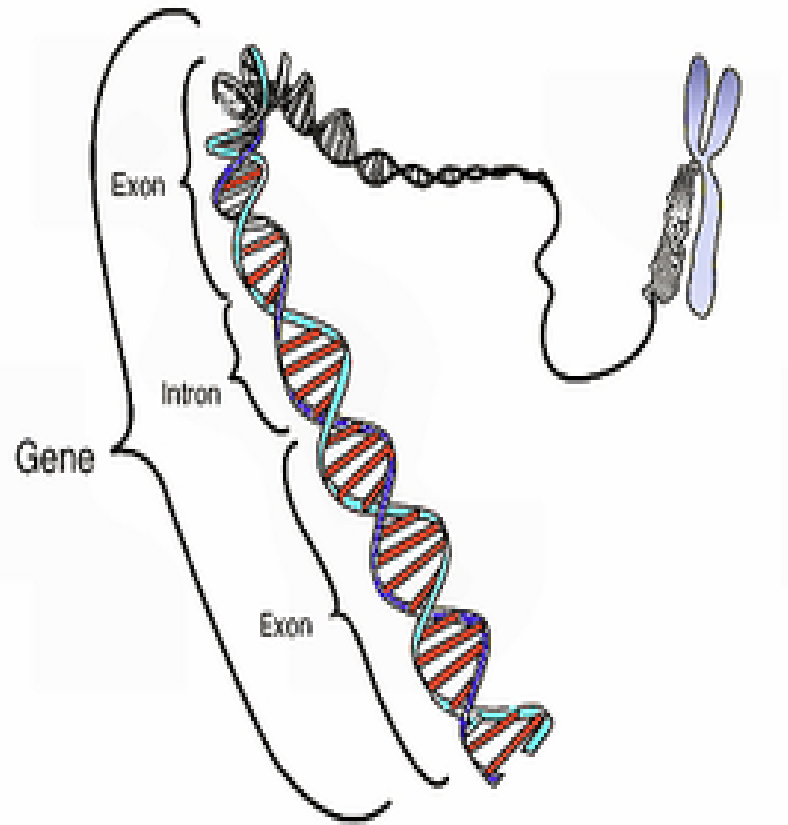
The entirety of an organism's hereditary information encoded in sequences of DNA and distributed in 46 (23 pairs) of chromosomes of between 400 to 3340 genes long. Each gene contains sequences of base pairs A,T,C,G.



The Gene

“a locatable region of genomic sequence, corresponding to a unit of inheritance, which is associated with regulatory regions, transcribed regions, and or other functional sequence regions ”

Pearson, 2006



The mature mRNA is composed of a 5' prime (red) exons (uppercase yellow) introns are shown in purple (lowercase) and 3' prime (red again).



DNA & RNA Coding

DNA

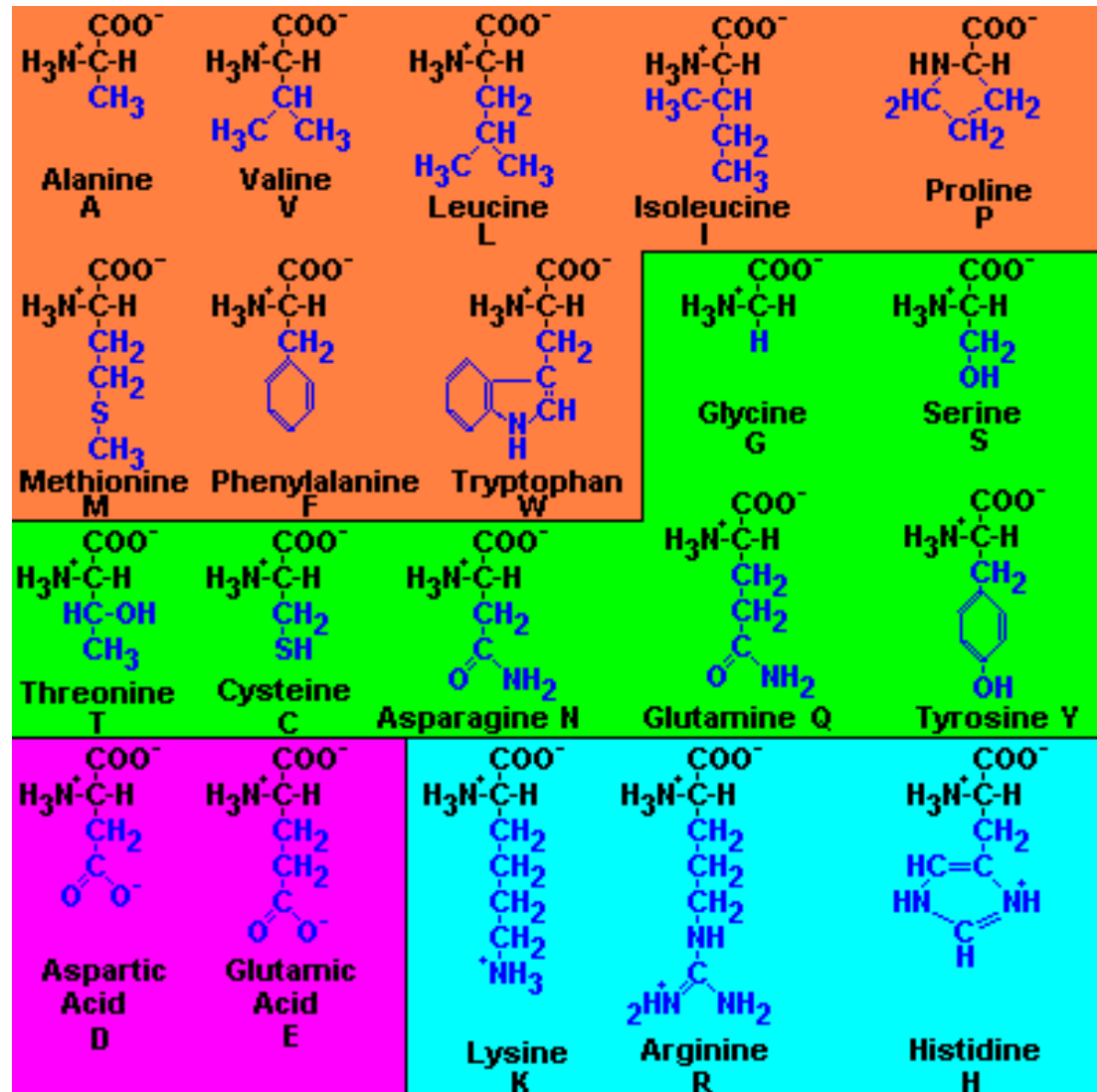
A	adenine
G	guanine
C	cytosine
T	thymine

mRNA

A	adenine
G	guanine
C	cytosine
U	uracil

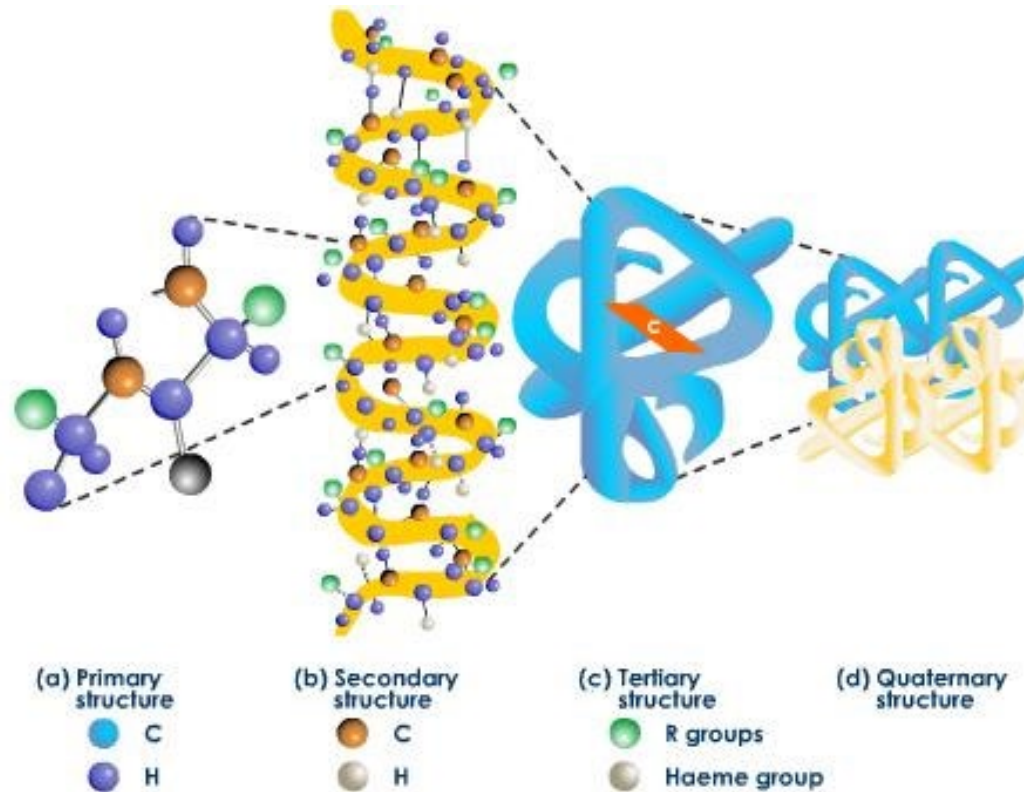
2 nd Posi- tion	1 st Position				3 rd Posi- tion
	T	C	A	G	
T	Phe	Ser	Tyr	Cys	T
	Phe	Ser	Tyr	Cys	C
	Leu	Ser	STOP	STOP	A
	Leu	Ser	STOP	Trp	G
C	Leu	Pro	His	Arg	T
	Leu	Pro	His	Arg	C
	Leu	Pro	Gln	Arg	A
	Leu	Pro	Gln	Arg	G
A	Ile	Thr	Asn	Ser	T
	Ile	Thr	Asn	Ser	C
	Ile	Thr	Lys	Arg	A
	Met	Thr	Lys	Arg	G
G	Val	Ala	Asp	Gly	T
	Val	Ala	Asp	Gly	C
	Val	Ala	Glu	Gly	A
	Val	Ala	Glu	Gly	G

Amino Acids



Proteins & DNA

- Proteins are the *functional units* of life.
- DNA makes RNA makes Protein



Epigenetics

The study of inherited changes in phenotype (appearance) or gene expression caused by Mechanisms other than changes in the underlying DNA sequence.

i.e. increased or suppression of specific genetic expression due to changes in the *uncoiling* of the DNA prior to transcription.

