HOMEOSTASIS brought about by interactions between our IMMUNE, ENDOCRINE AND NERVOUS SYSTEMS

The intricate web our body weaves

Write down your OWN answers to these questions

1) **How does your environment and lifestyle impact on your health?**
2) **How exactly do you think that could that happen?**
3) **Have you ever considered that your likes, behaviours and moods are affected by your immune system – as well as your hormones and nervous system?**

How could our thoughts impact on our cells and their work?

4) **We've heard about positive thinking and affirmations yet how could they actually make our body feel better?**

5) **Define, in your own words, how you think that maybe positive intent to heal may actually have an effect your body**.

I am trying to describe to you the amazing way our body works

Don’t feel like you need to understand all of what I am describing to you

Instead enjoy a few AHA moments which may help you understand what may be going on for you in your body/mind/spirit at the moment.

To be honest we (including the scientists!) may never know what’s truly happening.

All we can hope for is an insight into the workings – the web – of our wonderful organism

Emotions and the body - summarised

The mem-BRAIN sandwich

Life Experiences

Your sensory receptors

What makes us human?

The computer

Interprets the messages

What makes us respond as unique human individuals?

- Many components

Hormones

Emotions

Nervous systems

Immune system

Conditioning/memory

Genetic

Relationships

Our cell membranes are the key

- **Everything that our body needs to make or create – or breakdown - happens within our cells where our enzymes live.**

  Enzymes don't live in our blood

- **Everything has to get into our cells or leave our cells…**

- **Via our cell membrane**

Let's start with the cell membrane

The mem-BRAIN sandwich

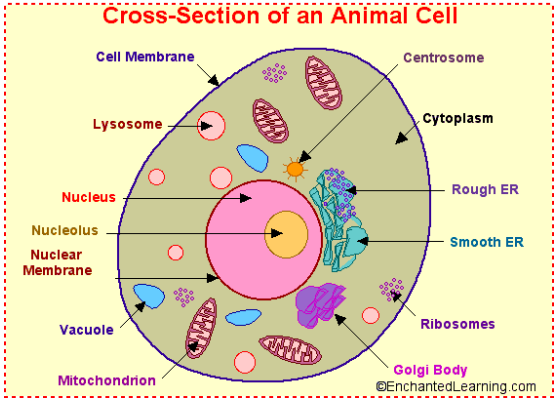
Outside cell

Inside cell

Bread only lets water-like molecules through
= hydrophillic

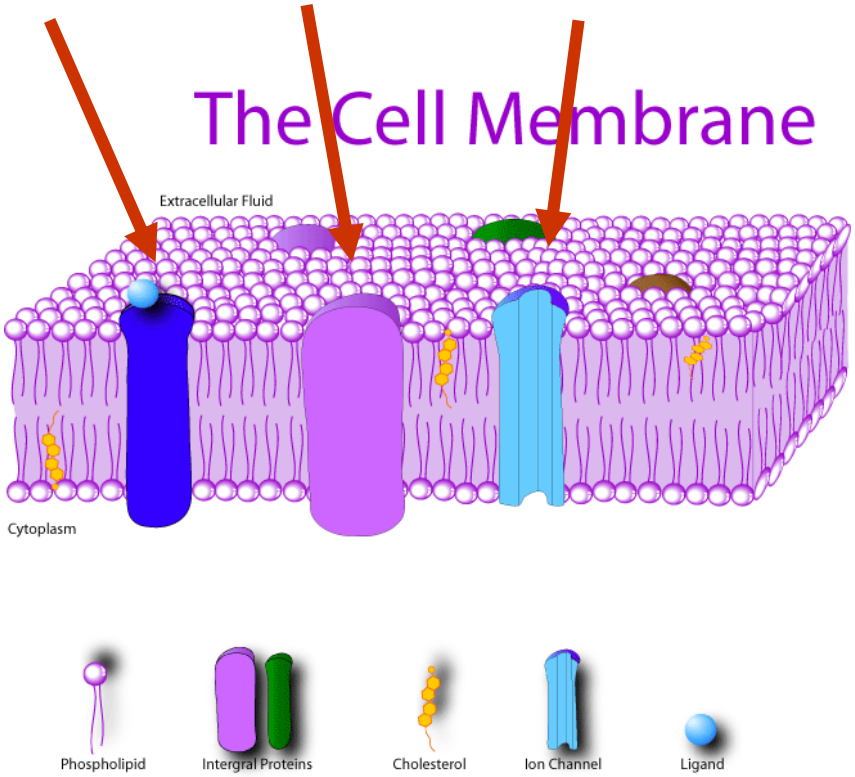
Filling only lets fatty molecules through
= hydrophobic

Phospholipids form a barrier



Add proteins which go through all the layers; they either

- 1) allow <u>specific</u> molecules through

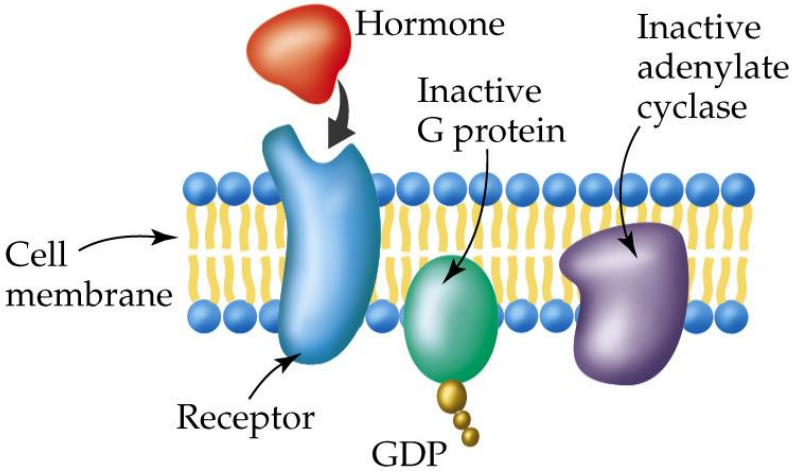


Add proteins which go through all the layers

- OR act as receptors/messengers

The sensory receptors

Hormone receptors

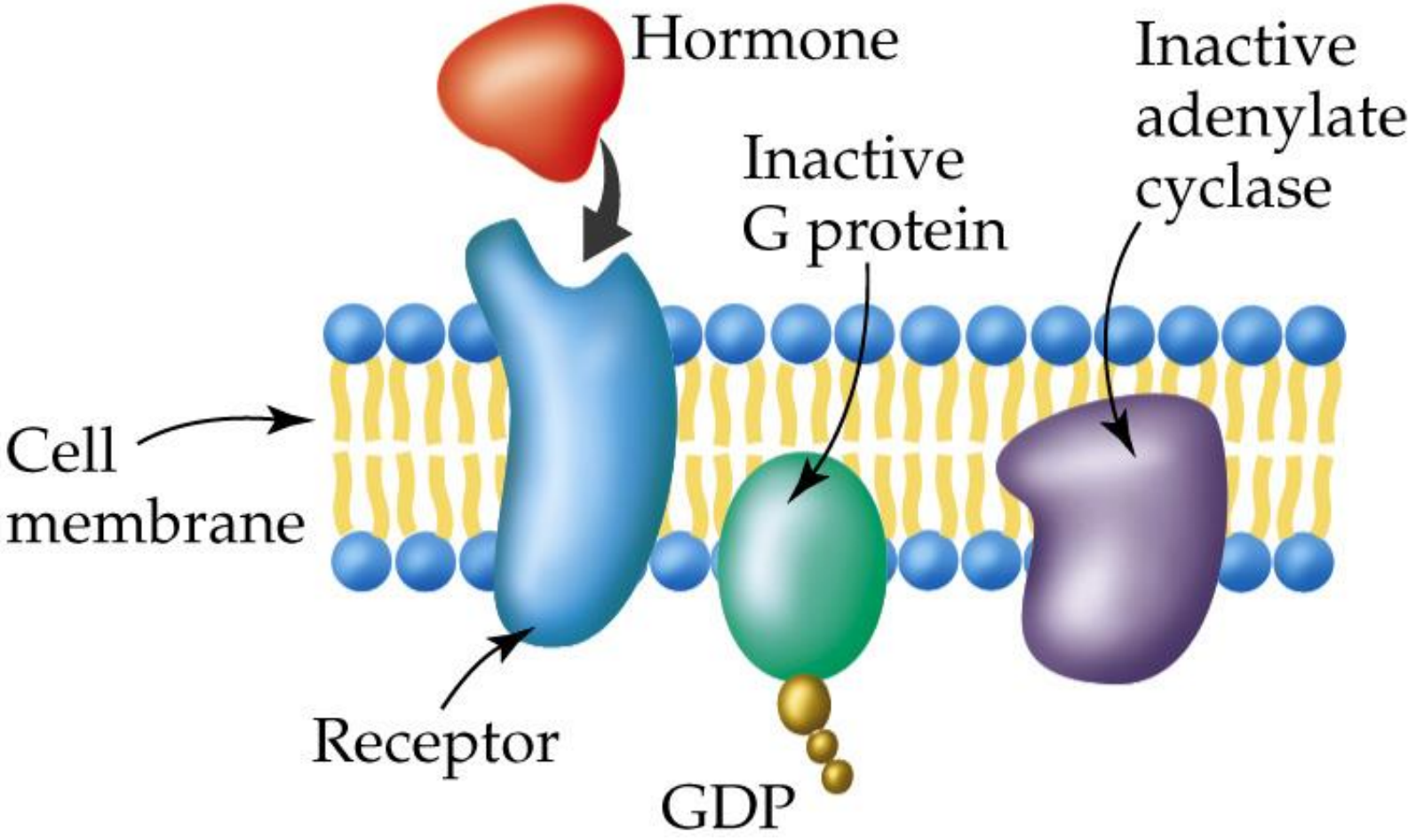


The process of sensation

1. Stimulation of sensory receptor by a stimulus
2. Generation of action potentials which move along nerve cell fibres toward the Central Nervous System (cns)
3. Integration of sensory output by cns = brain to create a response or action

Note; we seem to see with our eyes, hear with our ears etc because of the region in the brain where the impulses are received

The traditional scientists' lock and key model for hormones etc

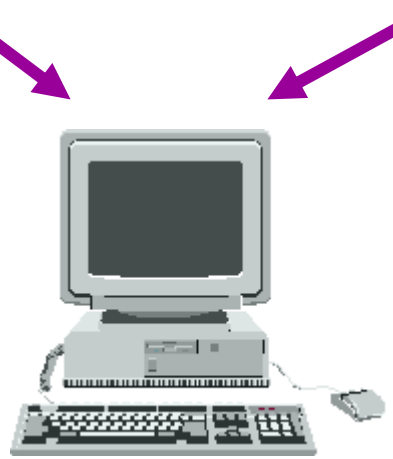


The computer interprets the messages

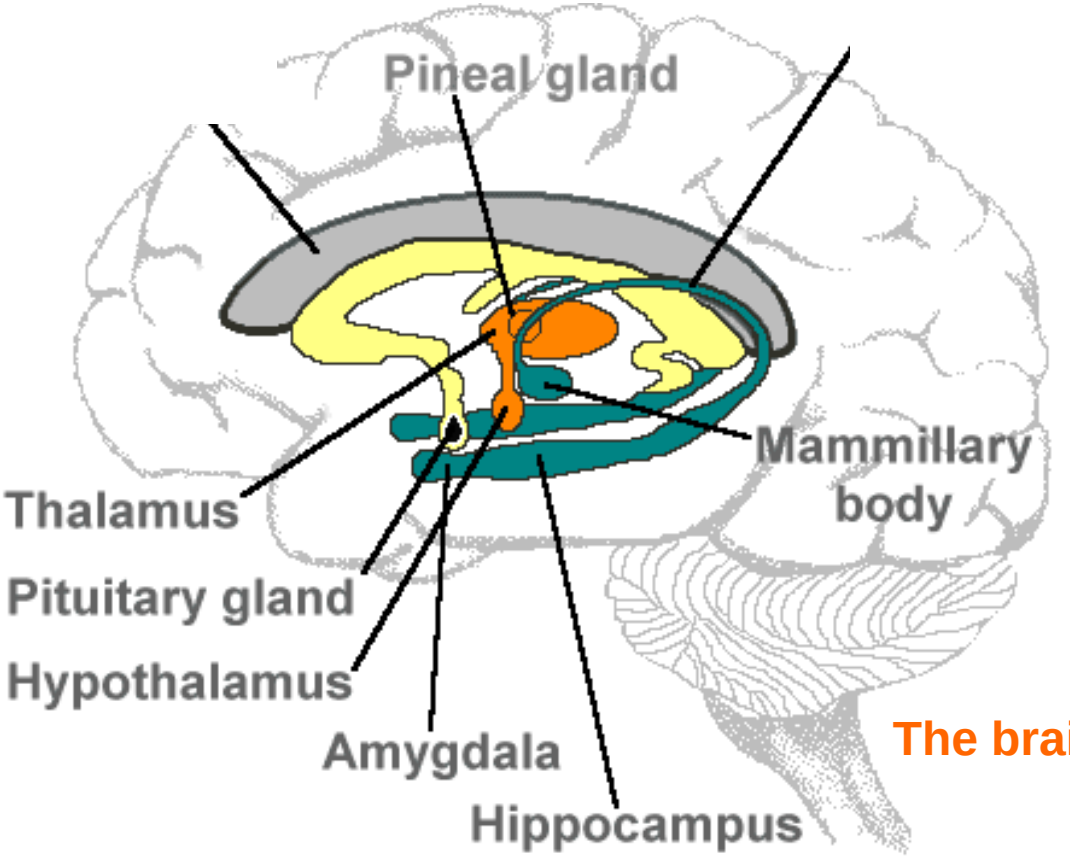
The emotional computer is the Limbic system containing the Amygdala and thalamus

The sensory receptors

Hormone receptors



The Limbic system



The Limbic System

The crocodile!!!

The crocodile has a brain stem, a cerebellum and a large limbic system and that's all!!

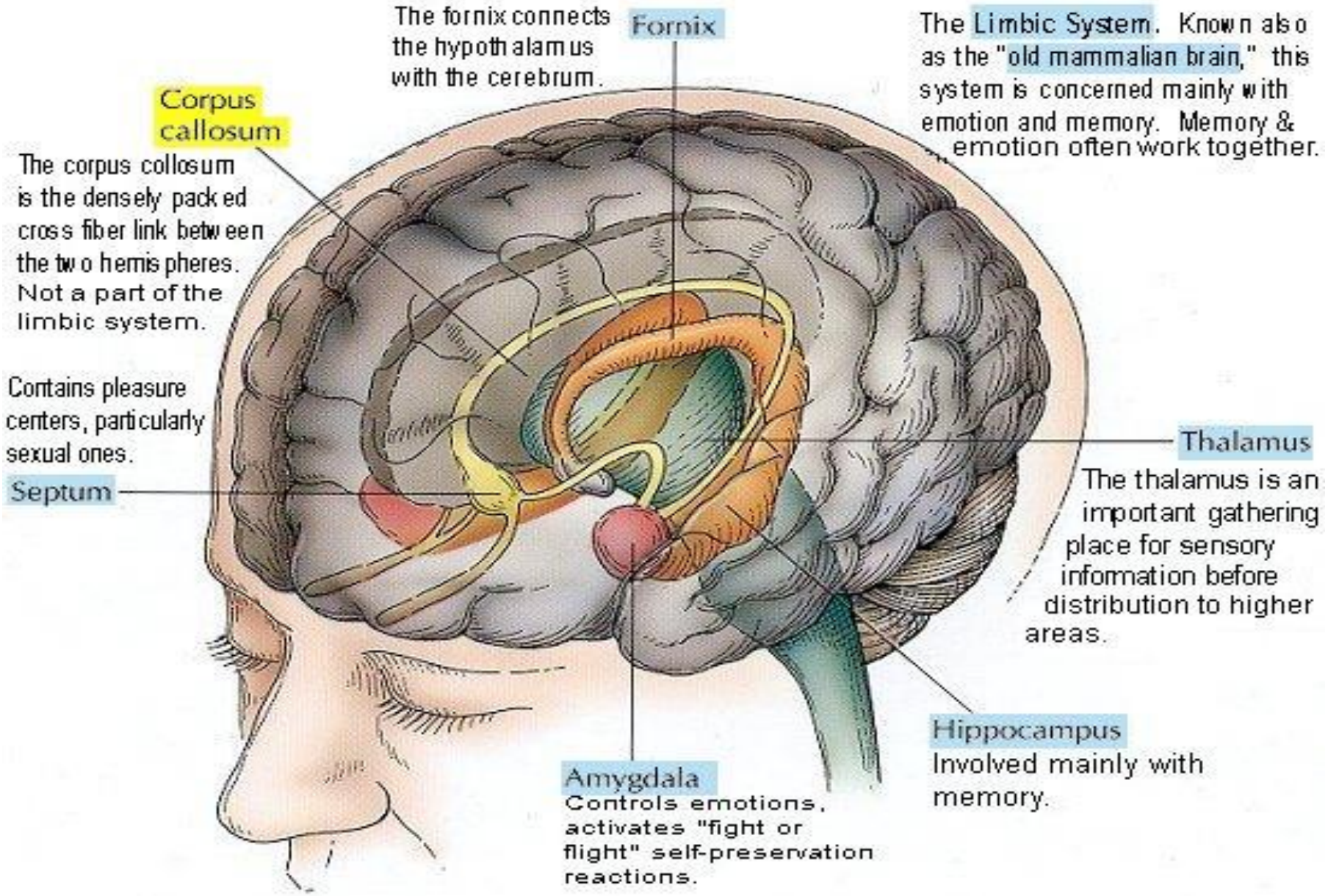
The front of his brain is all to do with basic anger, fear, pleasure, is it safe etc

No reasoning or intelligence to make decisions

Without reasoning eg fight or flight response to adrenaline, we are acting like crocodiles: we are acting from the limbic system which has no sense of time and acts without thinking.
Childhood memories are locked in the limbic system and we respond to them immediately – ***without reasoning***

CONDITIONING

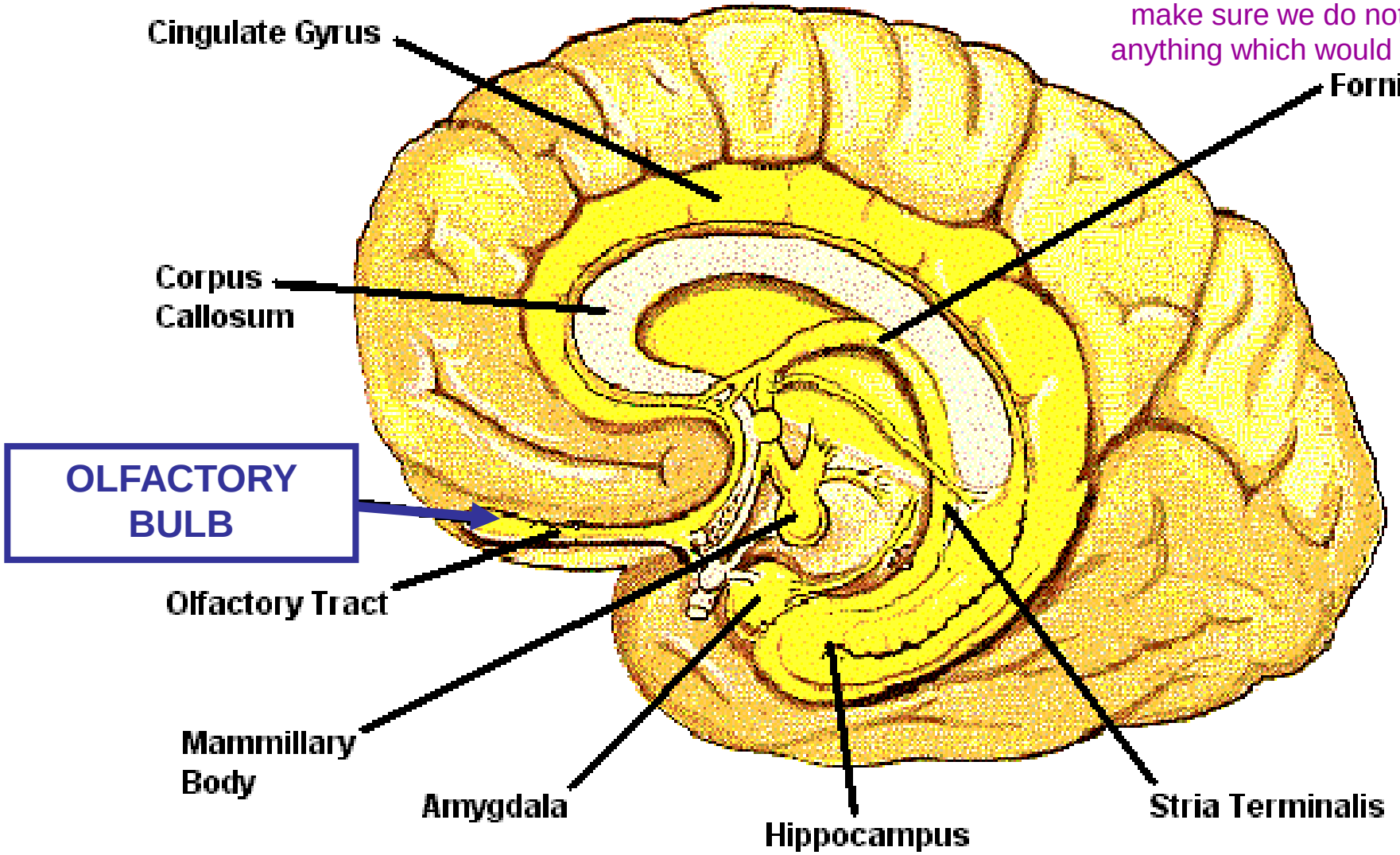
- According to learnt responses acquired during childhood we will all react to a specific situation in a unique way
- This is co-ordinated in the Limbic system
- Yet now we are finding out that the messages acting in the immune system affects our behaviours, mood and emotion (affective immunology) as well as the autonomic nervous system and the hormones



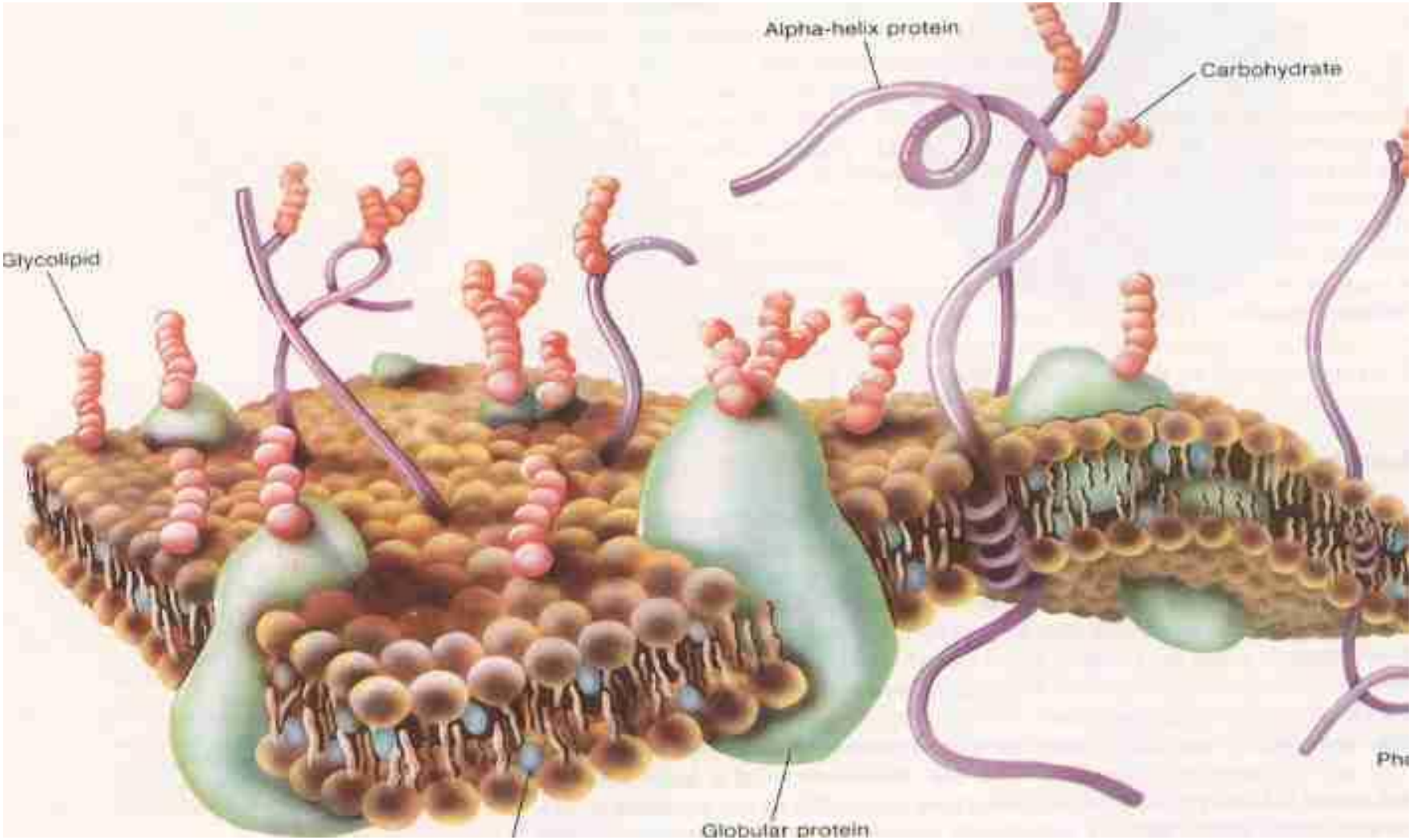
The major brain structures associated with the limbic system

Our sense of smell (safety!) is only one synapse away from the limbic system

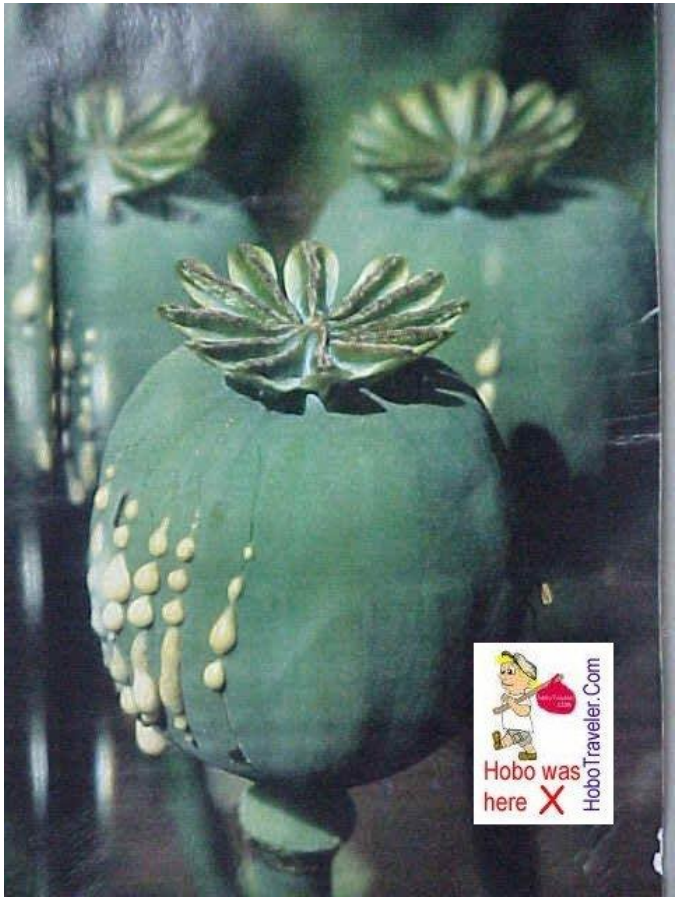
Remember
taste and smell
are closely linked to
make sure we do not eat
anything which would kill us



The opiate/endorphin receptors in the Limbic system cell membranes = happy



Opium mimics the endorphins



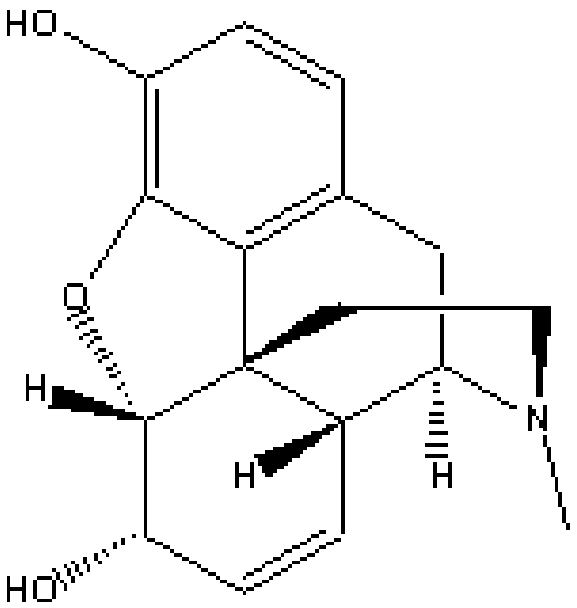
An opium den in Canton, 1919. The smokers seem to be scholars. Keystone Photo from the Library of Congress.

Candace Pert
Book = Molecules of emotion

- 1974 identified what's called the opiate receptor
- But why does the body have receptors for something produced by the poppy?
- Why does opium have such a pleasant effect?
- Because the **opium is mimicking the effects of our natural endorphins** at the opiate receptor site = **happy crocodille!!**

Morphine – the derivative of opium used to kill pain

- Morphine

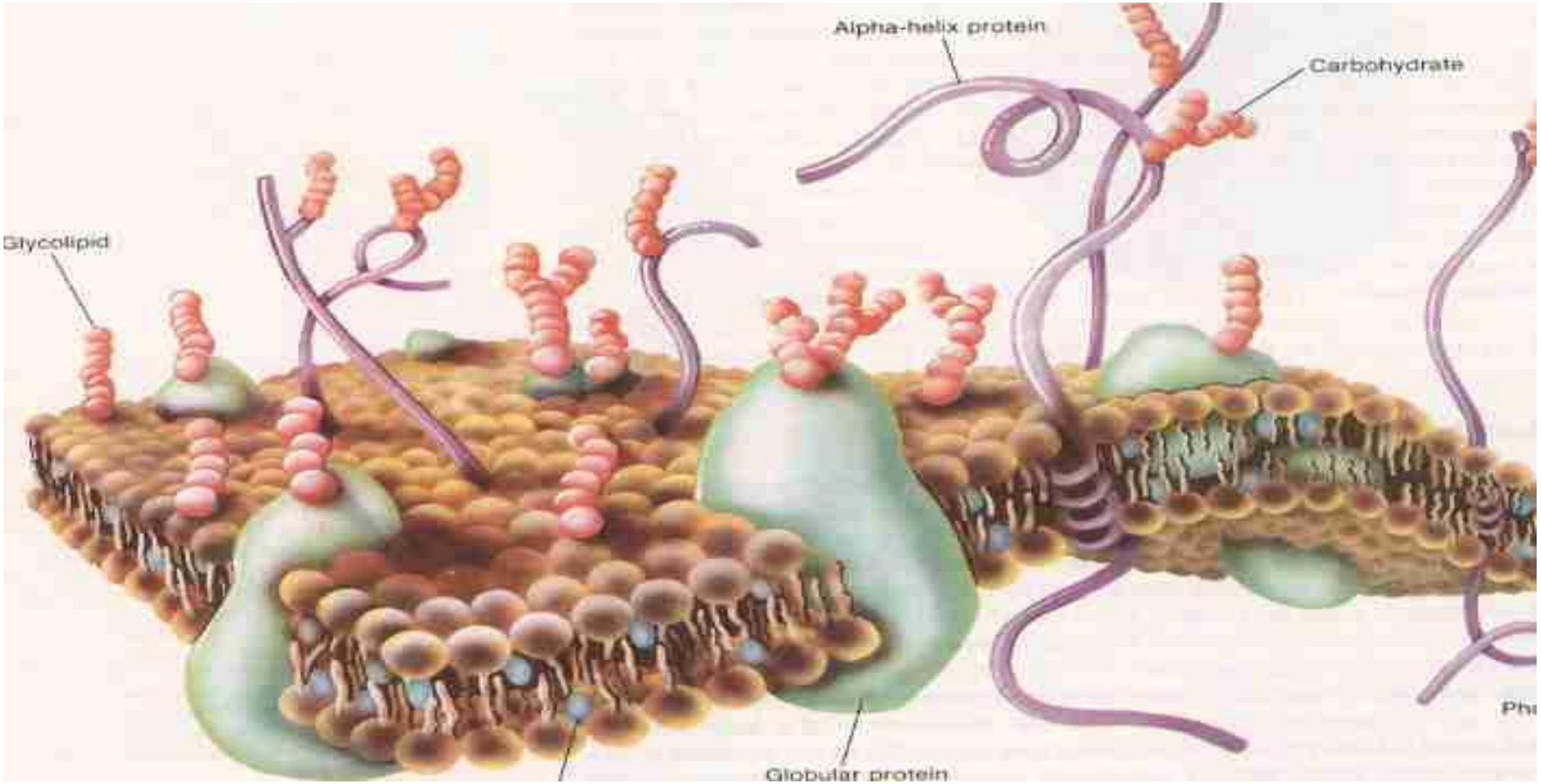


Endorphins all have a similar structure to this molecule

AT A SPECIFIC POINT

Opium and morphine mimick our naturally produced endorphins

Each cell membrane of the Limbic system has receptors for a multitude of molecules; each has a different message



The computer interprets all the messages

The emotional computer is the Limbic system

The sensory/autonomic nervous system receptors

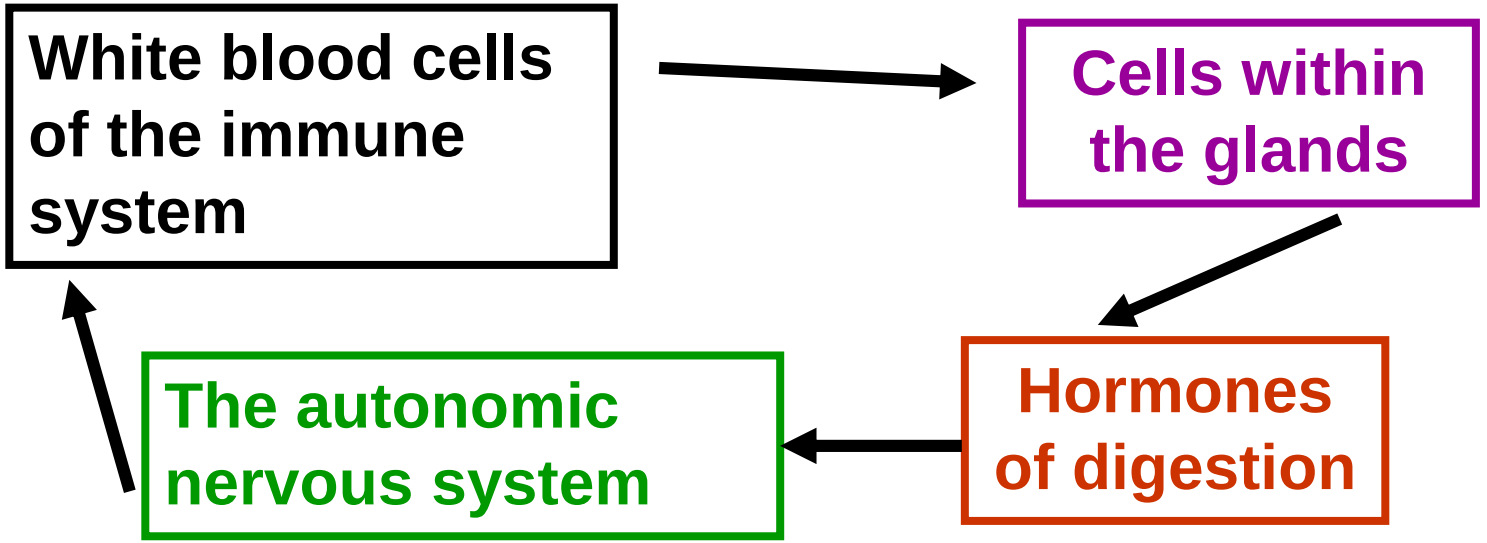
Immune system ???

Hormone receptors

Yet there are other systems which also have an impact on our emotions
It's all to do with HOMEOSTASIS

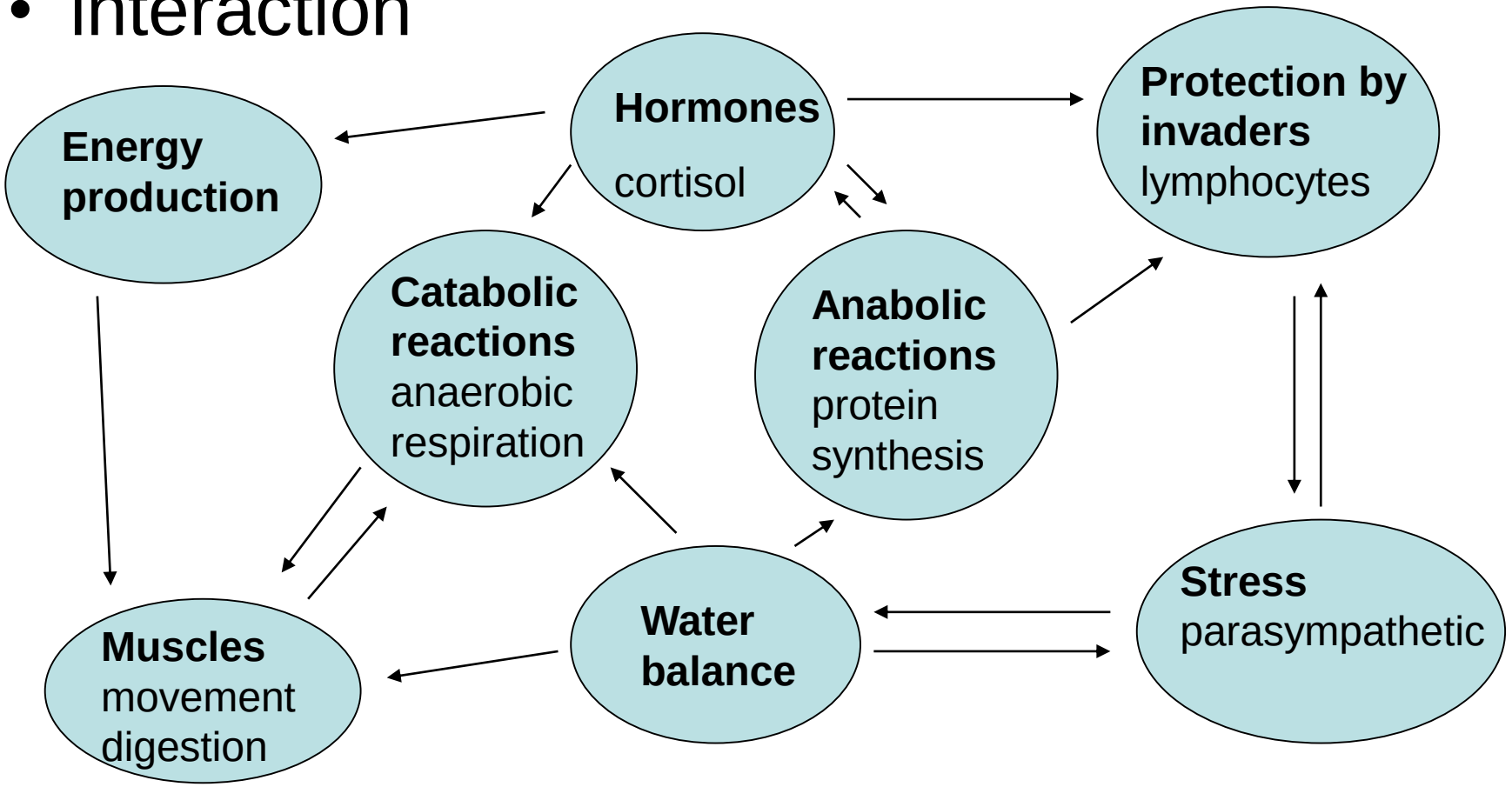
But not only the Limbic system

Each and every cell has a specific combination of receptors on its membrane which defines its actions and functions



Overview of the systems controlled by homoeostasis

- interaction



Equilibrium and homoeostasis

- Most of the reactions in the body are reversible ie able to go one way or another (controlled by one or two enzymes)
- The force of nature is to keep these reactions in equilibrium
- ie not static but flowing backwards and forwards all the time making fine adjustments like balancing on a big ball

Ways in which an equilibrium may be adjusted:

1. Amount of substrate
2. Amount of product
3. Temperature
4. Inhibitors of enzyme activity
5. Amount of enzyme available
6. pH

- It is important that the internal environment of our body is maintained within narrow limits
    - CONSTANT STATE = HOMOEOSTASIS
        - dynamic and ever changing

The cobweb = Equilibrium and homeostasis

enzymes are our catalysts – can be switched on or off by other factors

Enzyme controls reaction to right eg ptyalin which digests sugars in our mouth

Enzyme controls reaction to right

Precurser eg glucose ⟷ Result eg acetyl CoA which becomes precursor ⟷ Result cascade of reactions of oxidative phosphorylation ⟷ ENERGY in mitochondria

Enzyme controls reaction to left

Enzyme controls reaction to left

FEEDBACK

What do we all need around us to feel happy and content?

Time to be heard

- Safety and security
- Comfort and warmth
- Rejuvenating effects of healthy food, water and supplements
- The sense of touch and being a part of community
- These all affect the Limbic/immune/ autonomic nervous systems

The study of how these systems work together is PHYCH0-NEURO-IMMUNOLOGY

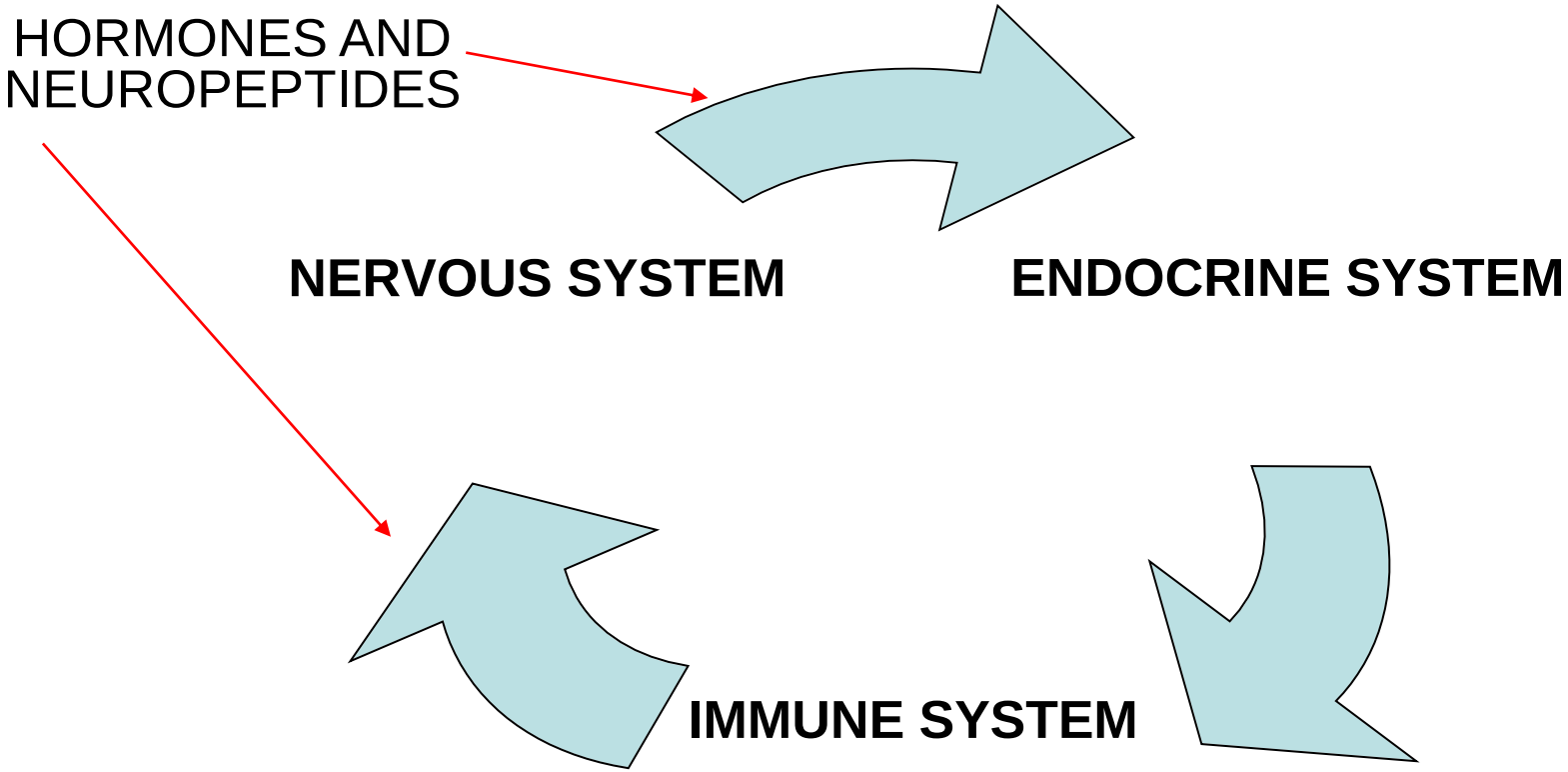
- Study of the interactions between;

1) Hormones(Psycho = emotions)
2) Autonomic nervous system (neuro)
3) Immune system (immunology)

ALL MEDIATED BY THE RECEPTORS

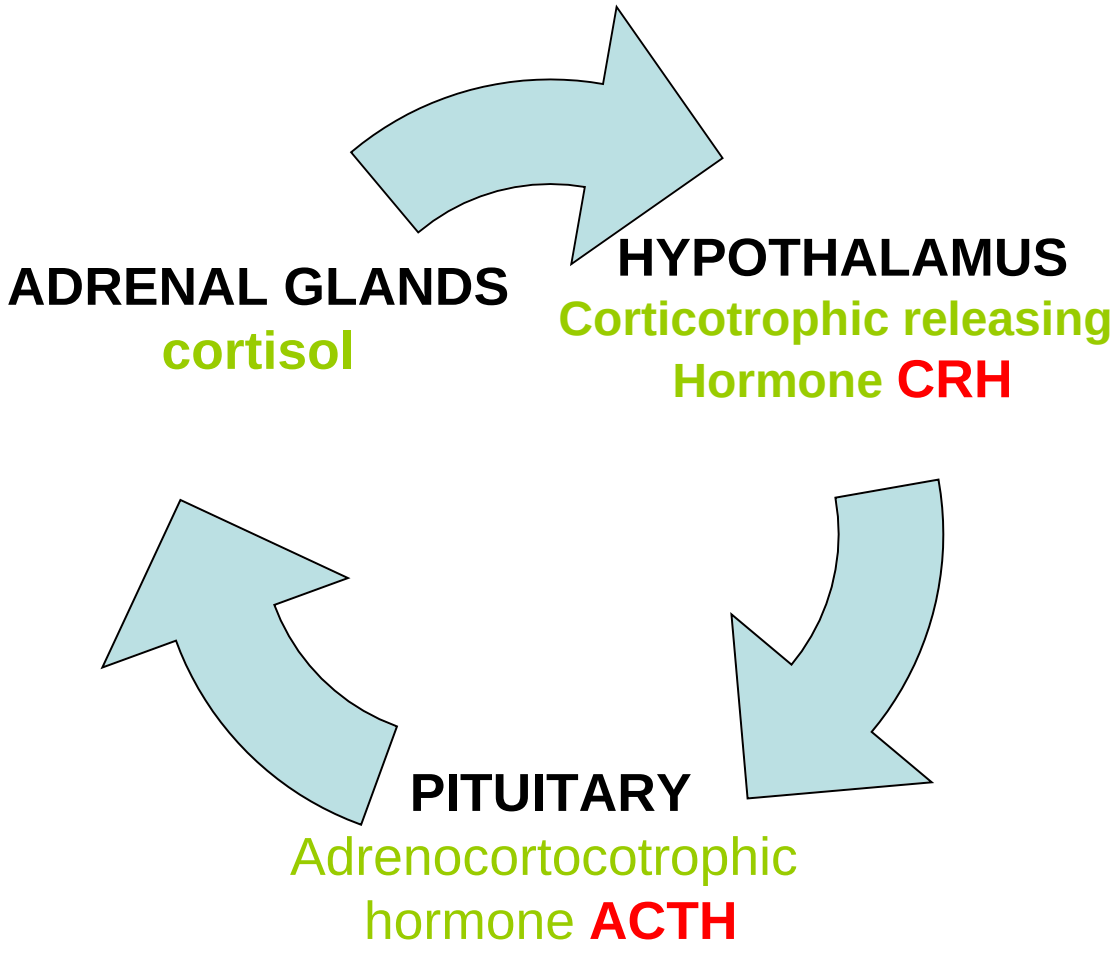
PSYCHONEUROIMMUNOLOGY = PNI

The inter relationship between the nervous endocrine and immune systems



THE HPA AXIS

Stress causes increased activity and an inability to switch off
= increased cortisol levels affecting the immune system



Think of anyone you know with;

a) stress

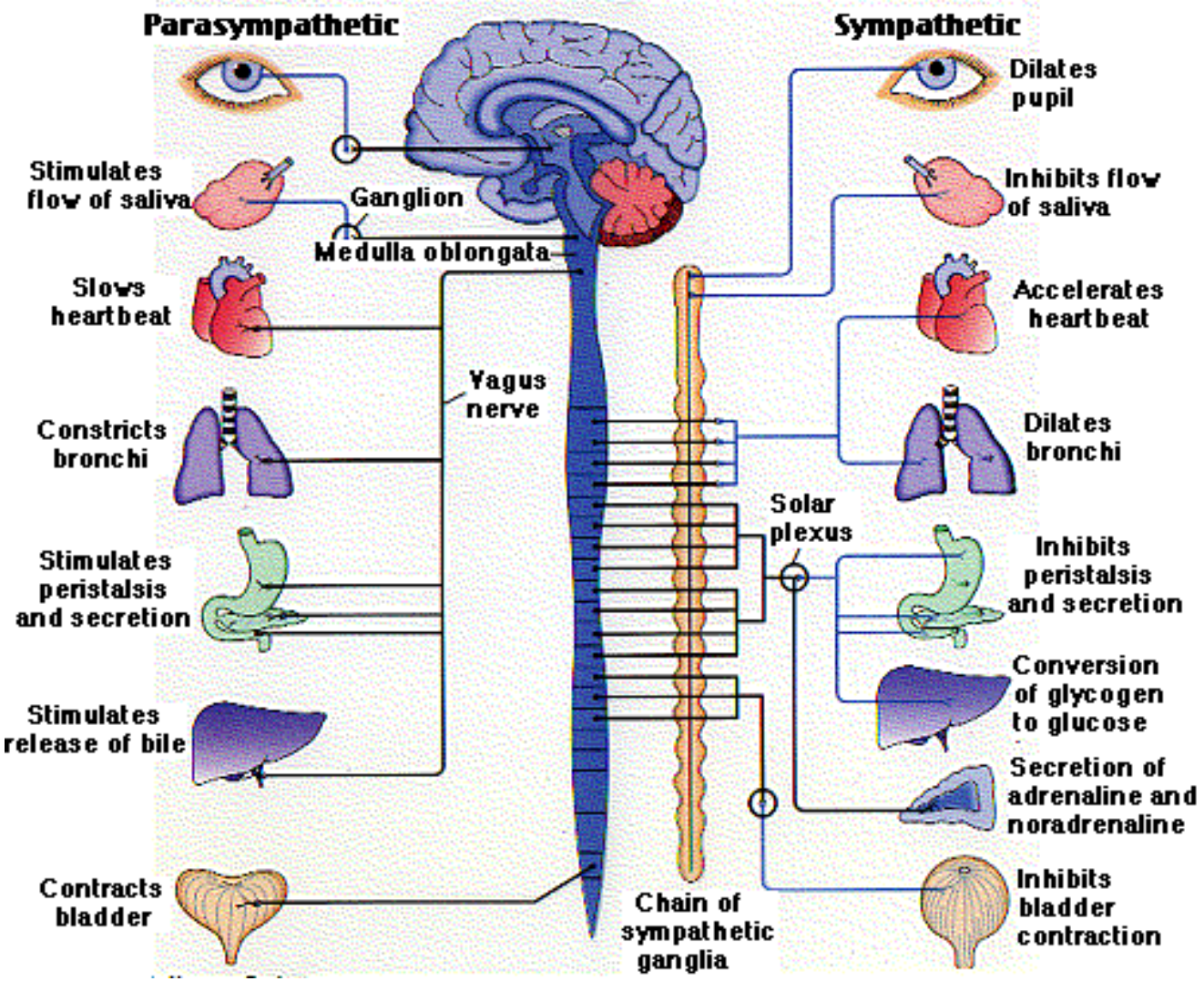
b) depression

c) cancer

d) ME or CFS or fibromyalgia

These are all possibly suffering from an imbalance in the HPA axis

Because adrenaline is involved this triggers the autonomic nervous system



1) Fright triggers the sympathetic nervous system

2) Parasympathetic returns us to Peace and tranquility

Parasympathetic returns us to Peace and tranquility

- Returns the immune system to non alert
- Allows us to digest again – digestive hormones and enzymes
- All the smooth muscle returns to normal vessels relax

  digestive system motility back to normal

What makes us human?

Our unique human response

What makes us respond as unique human individuals?

- Many components

Hormones

Emotions

Nervous systems

Immune system

Conditioning/memory

Genetic

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What about the possibility that the power of intent to be relaxed can change the messages at the receptors?

David Hamilton's book - How your mind can Heal your body

The receptors would eg;

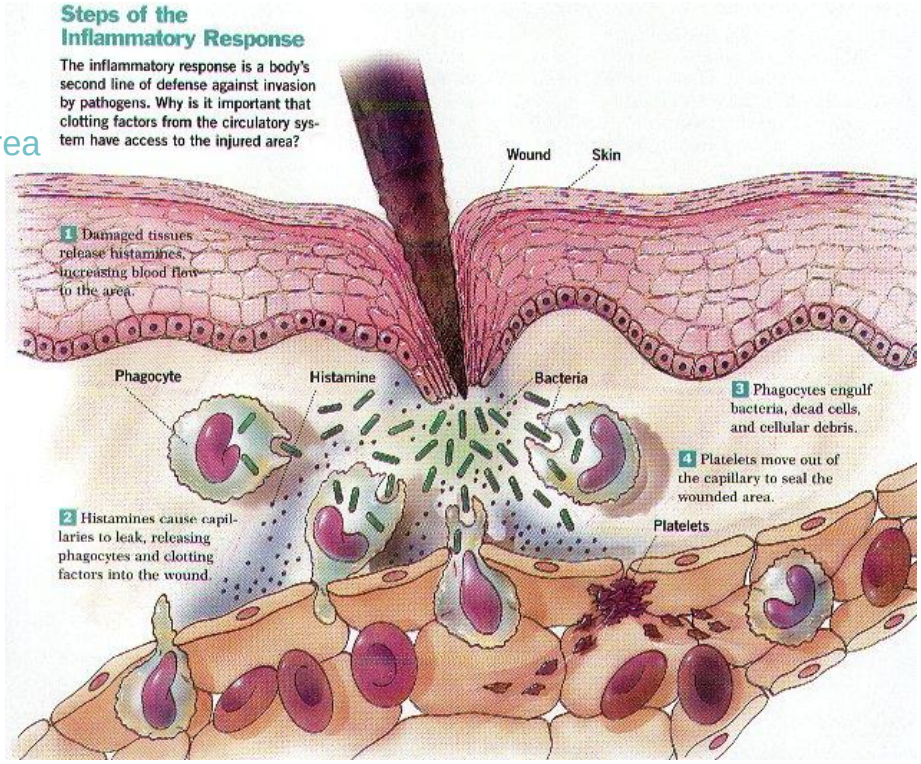
- Increase the amount of oxygen or glucose going into the cells
- Help cells to clear toxins
- Calm down the inflammatory response by the immune system
- Soothe all of our up tight systems

The inflammatory response to injury and how to treat

Acute –
red,
swelling,
hot
COLD only

Sub-acute and chronic
1 minute cold
then
3 minutes hot
x 5 twice a day

- Damaged tissues release histamines
- increasing blood flow to the area
- Capillaries leak releasing phagocytes
- And clotting factors
- Phagocytes engulf bacteria
- Platelets move out of the capillaries
to Seal the wounded area



Remove the nasty baggage = pac men
who grab the baggage
and take to conveyor belt = dustbin men

A new theory for us to consider

People who expect to get better - for example they have support from a therapist or GP or medication and think positive - tend to do so, especially if they have confidence in their support = placebo

Quantum theory says that reality depends upon the way it is observed – as soon as we observe something we change it

Emergent entanglement theory

- Hyland 2004; “Emergent entanglement theory …proposes that therapists/GPs adopt an observational mode that helps entanglement manifest itself; not only for the therapist but also for the patient”

What has this presentation said to you?

Have you understood how our body is adjusting and looking to create Homoeostasis keeping us as well as it can? Equilibrium is important.

Have you got an idea as to how our emotions can affect our immune system/nervous system/hormone system?

AND Vice versa?

Can you understand how our emotions and feelings impact on these systems? …and how we REALLY CAN change our cells and our Homoeostasis by being more relaxed?

Messages which travel along our nerves will impact on our whole body, immune system and hormonal system

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