

The
Children's Trust
Tadworth

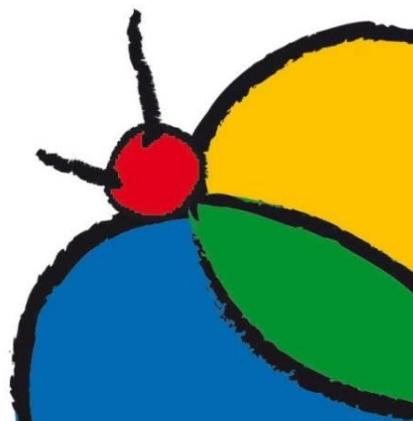
For children with multiple disabilities

An Introduction to Acquired Brain Injury

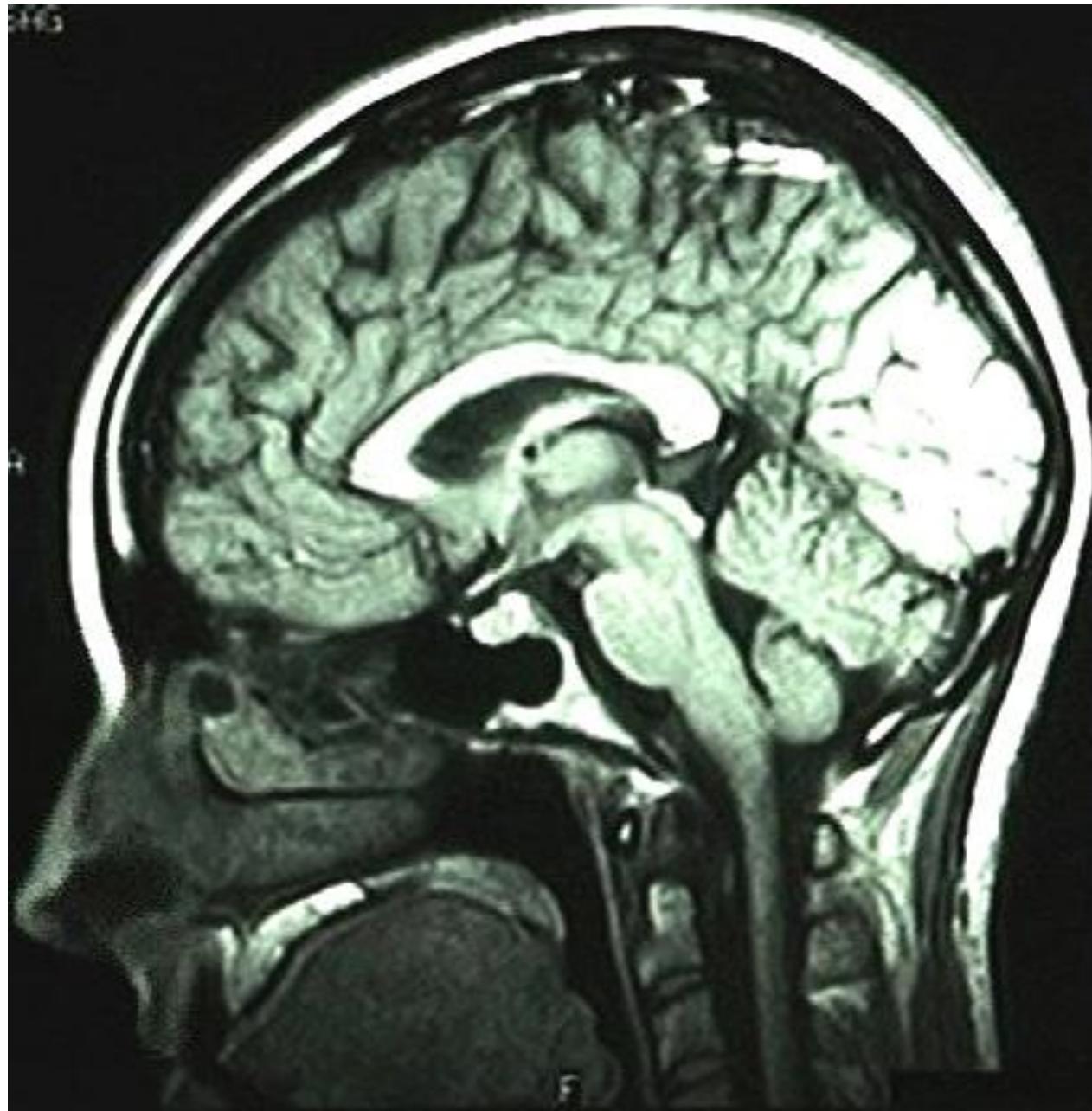
Dr Gail Hermon
Clinical Director, Rehabilitation
The Children's Trust

Aims of Session

- introduction to the anatomy and the functions of the brain
- then the damaged brain
- differences between Cerebral Palsy and Acquired Brain Injury in childhood
- maturation of the brain

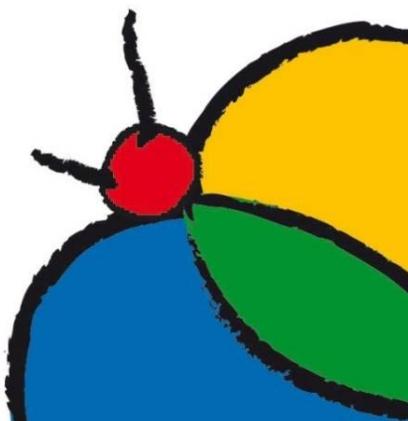






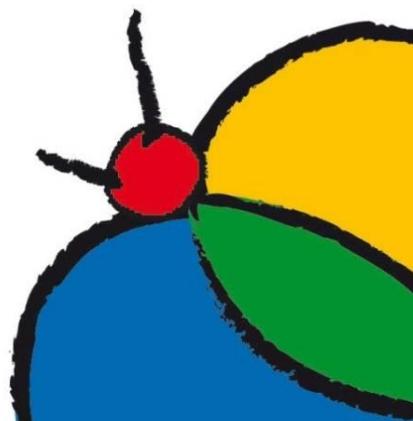
What is Acquired Brain Injury?

- An injury to the brain after the age of 18 months: Cerebral Palsy is the result of damage to the developing brain before this
- Traumatic
- Non-traumatic



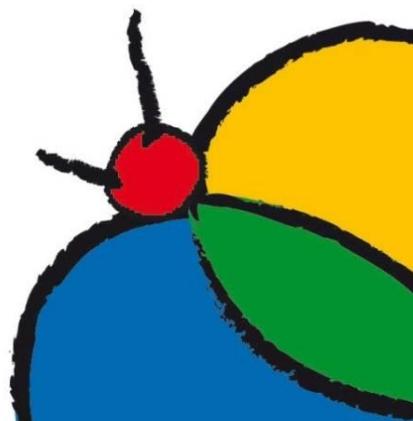
Acquired Brain Injury

- Traumatic
- Non Traumatic eg encephalopathies, meningitis, tumours, arteriovenous malformations, drowning,



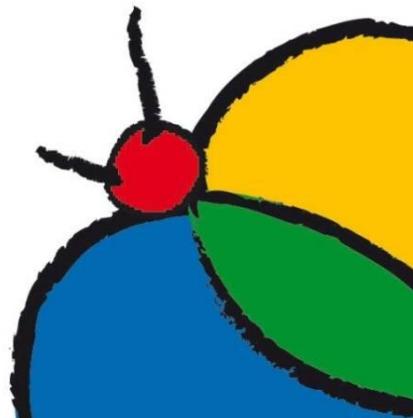
Acquired Brain Injury (ABI)

- There are about 800-900 major paediatric ABIs, resulting in significant disability, each year in the UK
- 250 infectious/immune mediated cause
- 300 paediatric strokes
- 120 brain tumour survivors
- 150 traumatic causes



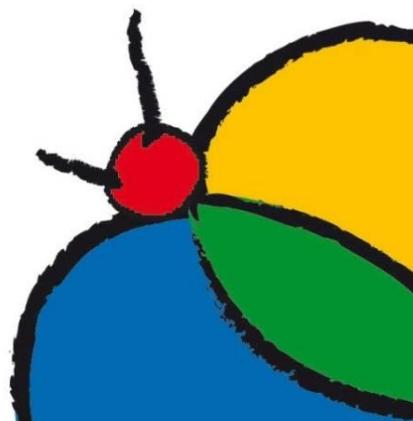
Cerebral Palsy

- Persistent disorder of movement and posture caused by non-progressive damage to an immature brain
- Damage to the brain sustained during pregnancy, during labour and up to the age of 18 months



Cerebral palsy

- 2.2/1000 live births (>50% term babies)
- Incidence unchanged
- Incidence of common conditions asthma
1/25, epilepsy 1/100, DM on the increase
1/100



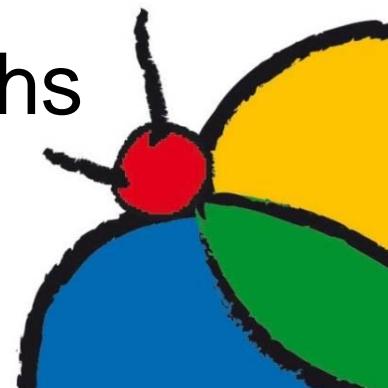
Cerebral Palsy

Causes

Pre natal
Peri natal
and Post natal

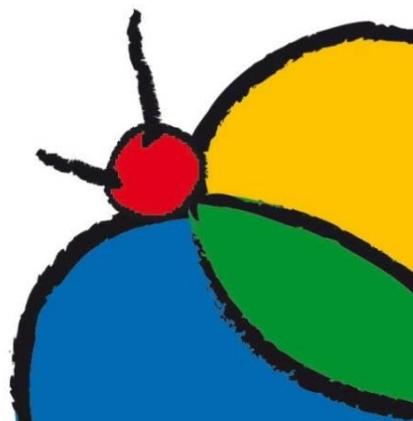
Risk factors

prematurity
multiple births
infection
NAI
teenage births



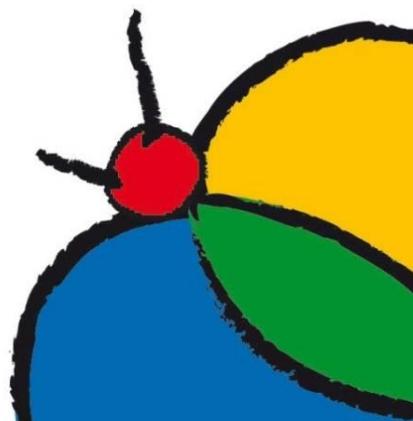
Anatomy of the brain

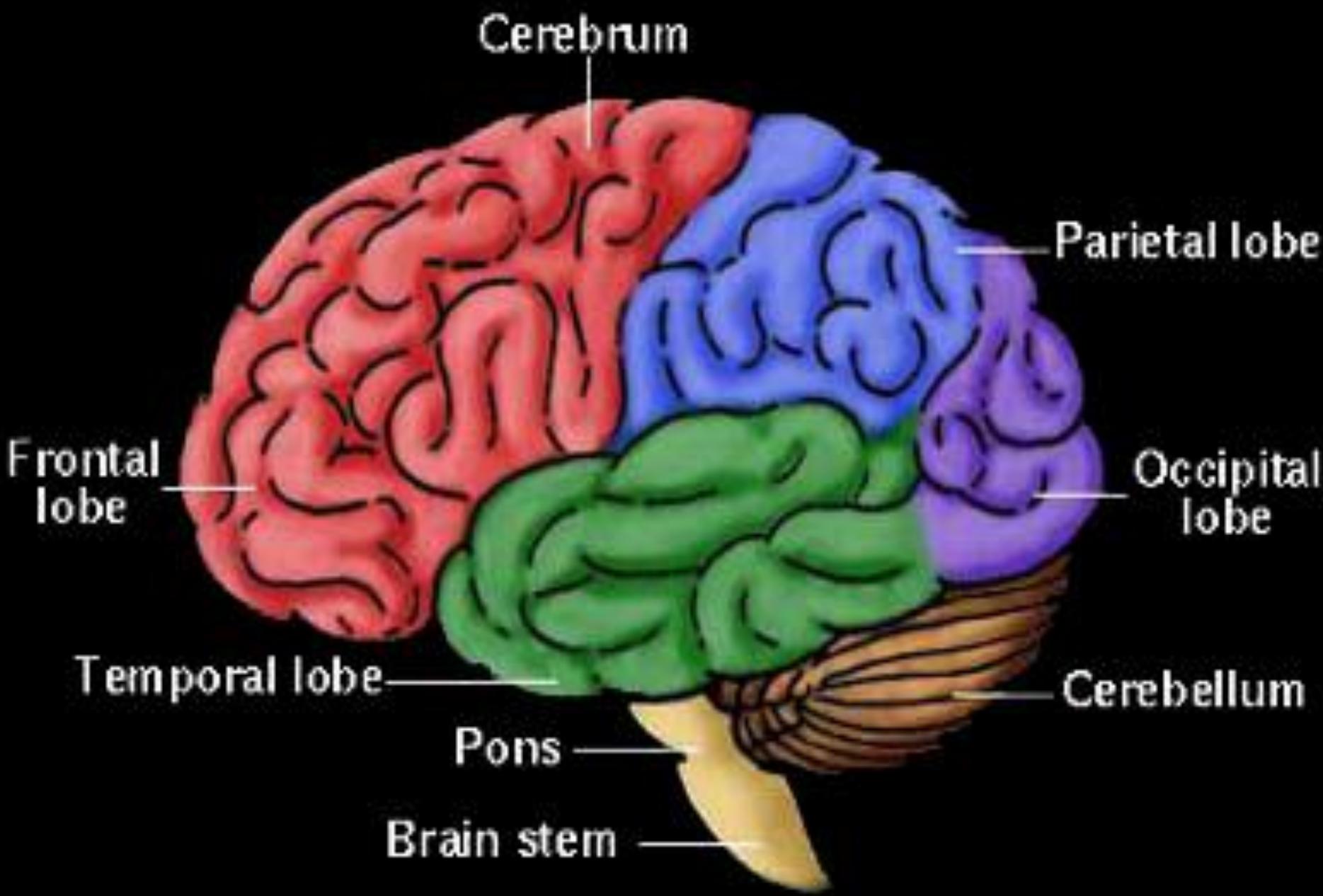
- Cortex = conscious brain
- 4mm thick
- 40% of the brain
- 60% is subconscious
- Different areas starting with the lobes of the cerebral cortex



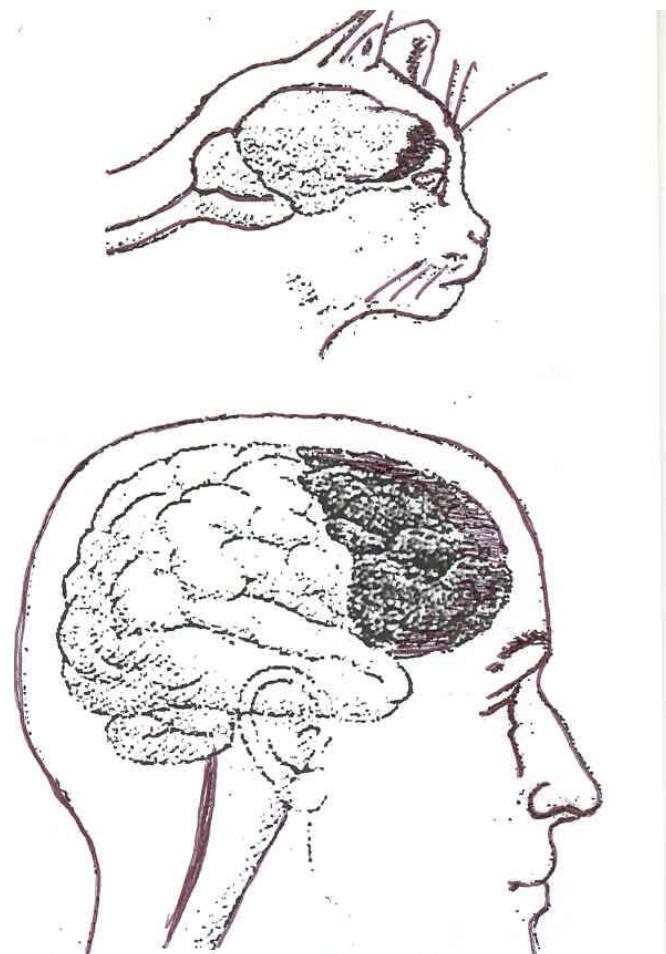
Cortex

- Man 40%
- Gorilla 20%
- Dog 6%
- Cat 2%





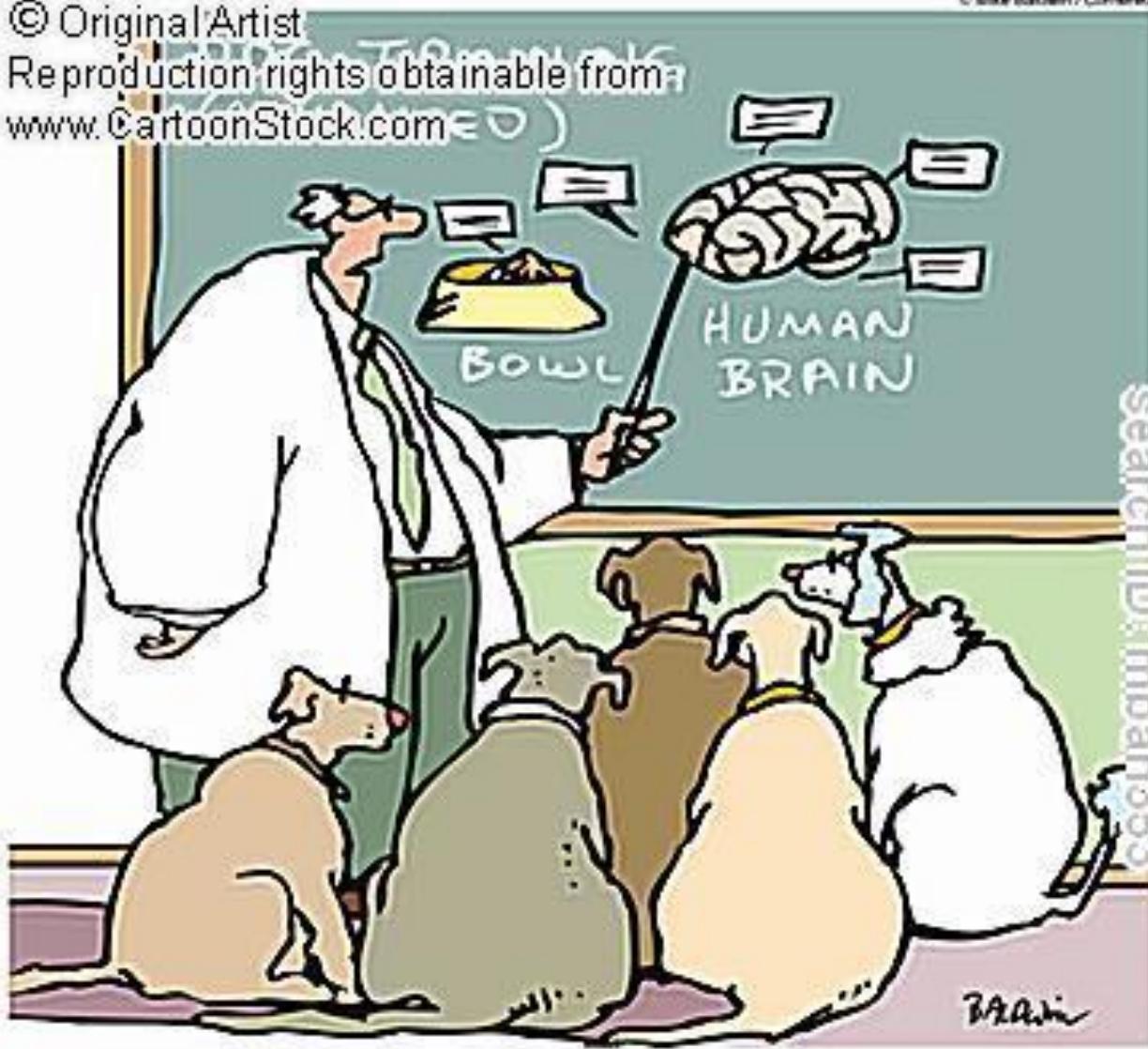
What a difference a frontal lobe makes!



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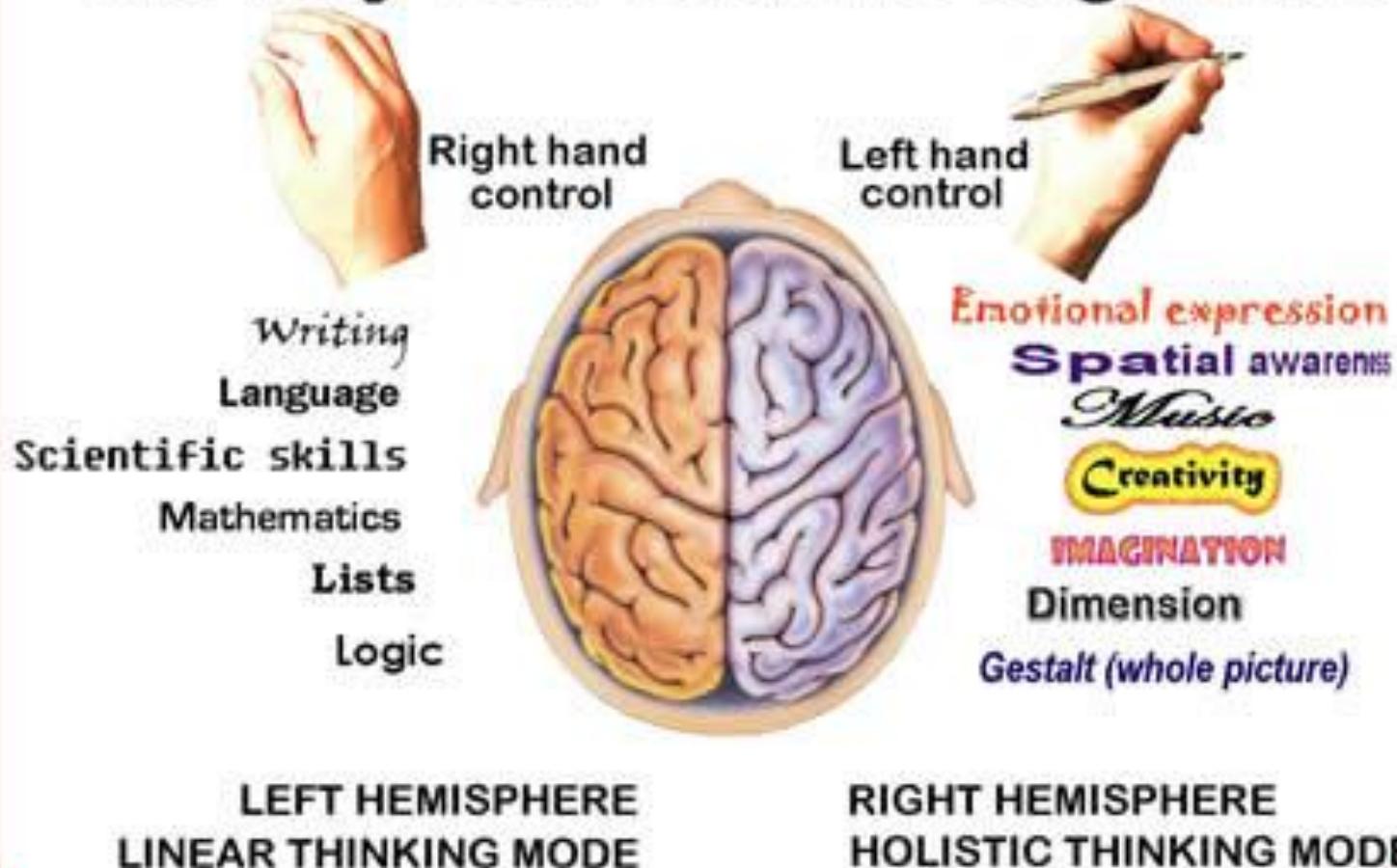
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"The prefrontal cortex is involved in higher mental functioning, like using a can opener and remembering to feed you."

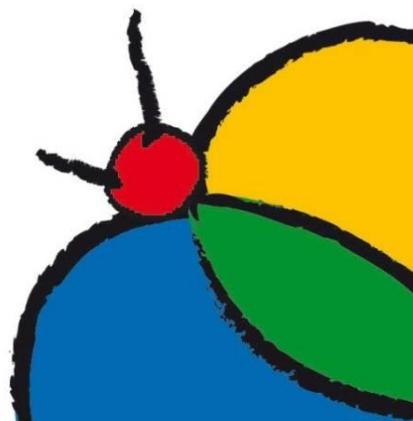
Anatomy of the Brain

The Way Your Brain Is Organised



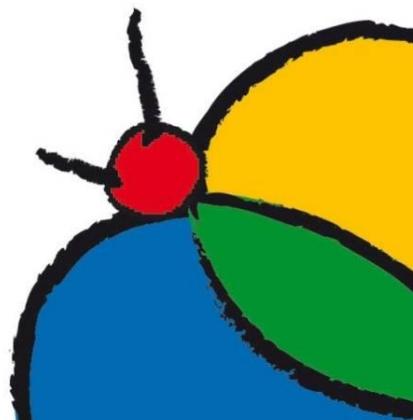
Limbic structures (old mammalian brain)

- Situated in the midbrain.
- Responsible for self preservation (flight/ fight) ie survival
- Monitors all information entering the central nervous system.



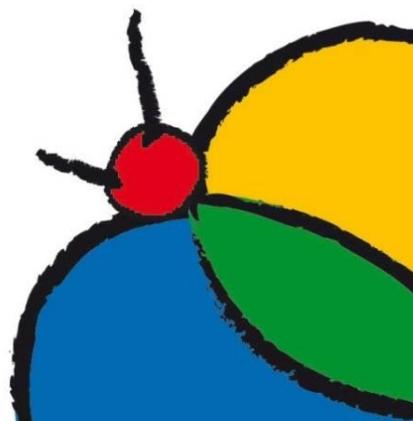
Limbic structures

- Deep within the brain so quite well cushioned in traumatic ABI
- Thalamus: relay station directing all incoming information to other brain areas for processing
- Amygdala: this generates fear and stores emotional memories



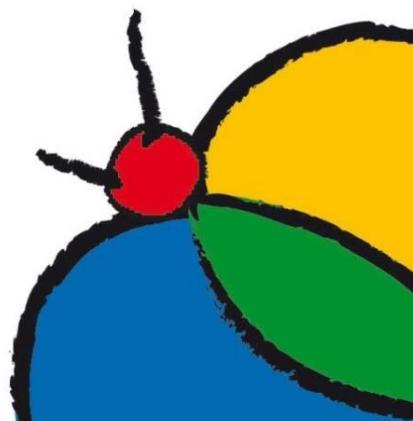
Limbic structures

- ‘The hippocampus is crucial for recognising the face of your cousin. But it is the amygdala that adds that you don’t really like her’. LeDoux 1998

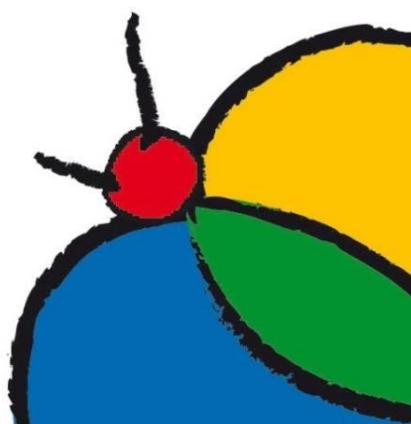


Implications of ABI

- 3 main effects
- Physical
- Cognitive
- Emotional and Behavioural

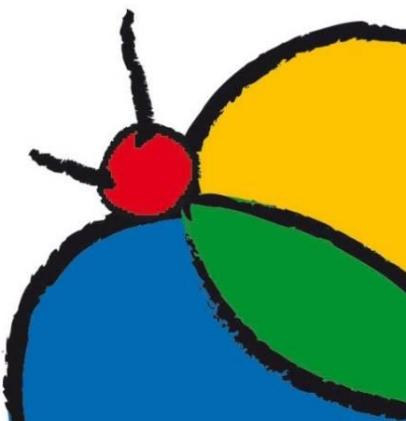


- Any child who has had an acquired brain injury has had a period of normal learning and development
- A child who has developmental delay/ Cerebral Palsy/PMLD as a result of a congenital problem will not have had the same learning opportunities



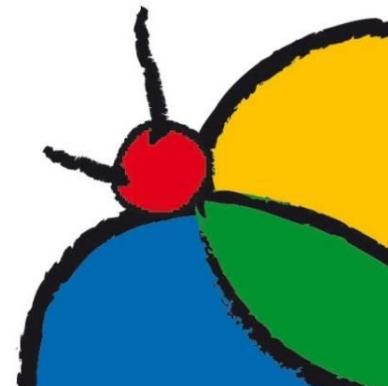
Age when injured

- 5 years
- 25 years



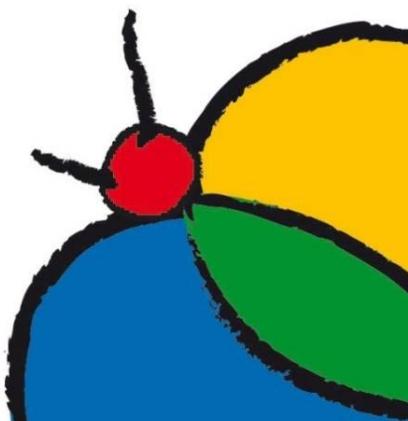
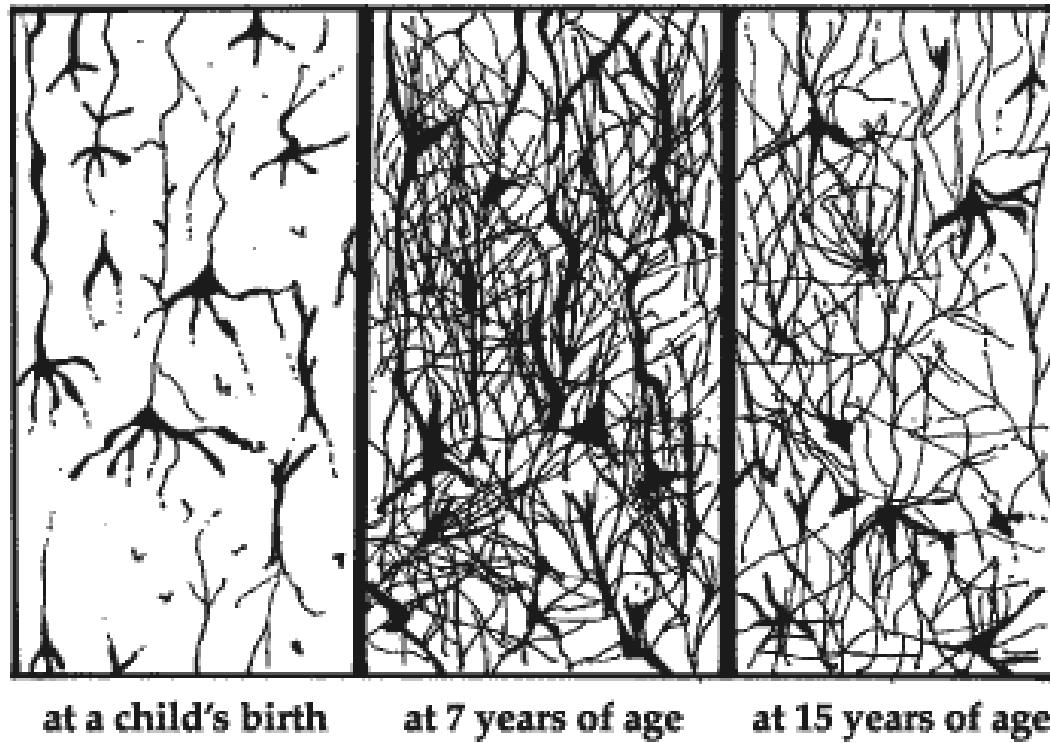
Cells in the brain

- 100 billion neurons 100,000,000,000
- 1 trillion glial cells 1,000,000,000,000
- Glial cells make up the majority of cells in the brain: they do ‘housework’ for the neurons
- 1,000,000,000,000,000 quadrillion synapses in the brain
- A single neuron contains between 1,000 and 10,000 connections with other neurons



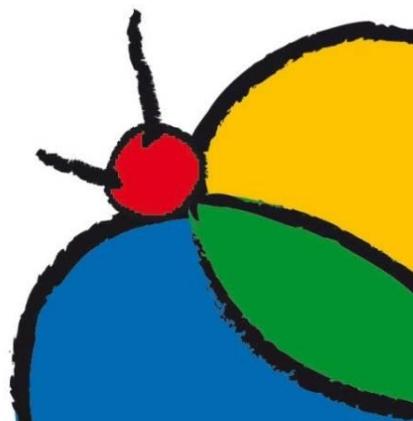


Brain development



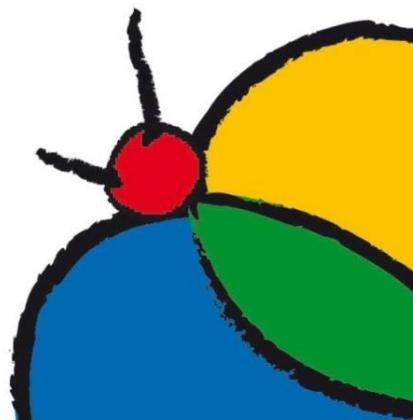
Development

- connections
- arborisation
- pruning back



Adolescence

- Increase in connections across the 2 hemispheres through the corpus callosum, beginning at the back of the brain coming forward
- Increased need for rest and sleep
- Further development of the Frontal Lobes



When are our brains mature?

- Girls
- Boys

