

- Brain anatomy was considered fixed – idea of curing an incurable disorder, improving the functioning of the brain or preserving them as they aged was inconceivable
- Brain cells could not be replaced
- Brain's structure couldn't be altered
- People with mental limitations were considered to be life long
- Treatment considered ineffective or unwarranted – neurological nihilism



neuroplasticity

/ˌnjuːərəʊpləˈstɪsɪti/

noun

the ability of the brain to form and reorganize synaptic connections, especially in response to learning or experience or following injury.

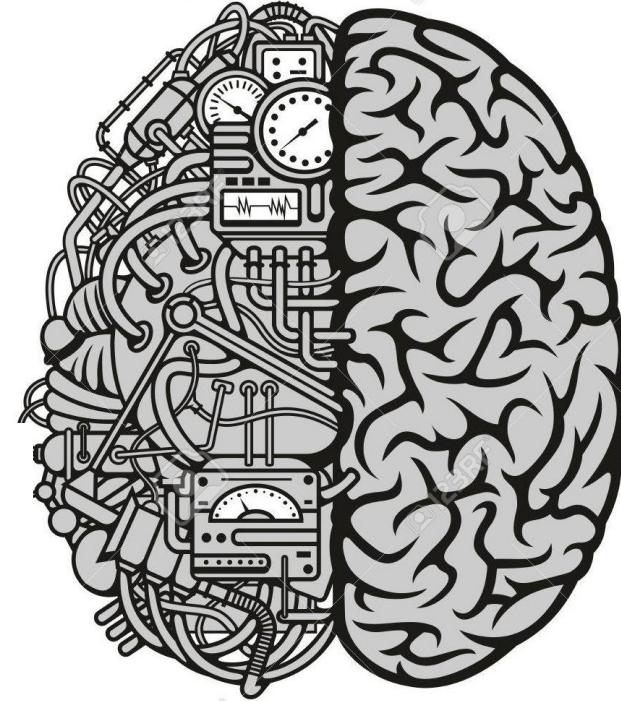
"neuroplasticity offers real hope to everyone from stroke victims to dyslexics"

- Vestibular apparatus (sensory organ for the balance system) not working – consists of three semicircular canals in the inner ear
- Constantly feels like she's falling
- Signals from vestibular apparatus go along a specialised clump of neurons – vestibular nuclei – process them and sends commands to muscles to adjust themselves
- Has strong link with visual system
- Considered a hopeless case
- Took part in experiment – wore hat with accelerometer and thin plastic strip with 144 electrodes is placed on the tongue
- Is able to stand free
- Sensations on tongue normally associated with the sensory cortex (processes the sense of touch) - made a new pathway in the brain which processes balance.



The Unchanging Brain

1. Brain damaged patients rarely make full recoveries
2. Inability to observe the living brain's microscopic activities
3. Brain viewed as machine – doesn't change or grow



- Pedro Bach-y-Rita suffered a disabling stroke paralysing his face and half of his body leaving him unable to speak
- His son conducted exercises – turned normal life experiences into training
- Made him crawl with his weak shoulder with the support of the wall
- Washed pots by holding with his good hand and made the weak hand do more movement
- Continued over a long period of time everyday until was able to walk
- Speech was too making a recovery
- After a year, his recovery was complete
- Was able to go back to teaching
- Passed away at the age of 72 – autopsy showed that the lesion was mainly in the brain stem
- Major brain centres in the cortex that control movement had been destroyed by the stroke
- 97% of nerves running from cerebral cortex to the spine were destroyed
- Only then did they realise how remarkable Bach –y-Rita's discovery was.

Can an incurable disorder be cured?

Neuroscience