

## Neural and Hormonal systems

### Biology, behaviour and mind

- Our understanding of how the brain gives birth to the mind has come a long way
- Ancient greek philosopher Plato correctly located the mind in the spherical head- his idea of the perfect form
- Aristotle (his student) believed the mind was in the heart, which pumps warmth and vitality to the body
- In the early 1800s German physician Franz Gall proposed phrenology, studying bumps on the skull could reveal people's mental abilities and character traits
- At one point Britain has 29 different phrenological societies
- Phrenology succeed in focusing attention on the localization of function- the idea that various brain regions have particular functions
- Today we study the links between biological activity and psychological activity, those working from the biological perspective are announcing discoveries some of which being
  - Among body cells are nerve cells that conduct electricity and “talk” by sending chemical signals
  - Specific brain systems serve specific functions (not the functions Gall supposed)
  - Integrate function processed
  - Adaptive brain wired with experience
- Biological perspective: concerned with the links between biology and behaviour, includes psychologist working in neuroscience, behavioral genetics and evolutionary psychology

### Neural Communication

- Comparing information systems of humans and other animals- cars differ, but all have engines, accelerators, steering wheels and brakes

### Neuron

- Building blocks of body's neural information system are neurons: a nerve cell.
- Each consists of a cell body and its branching fibers
- The busy dendrite fibers receive informations and conducts the impulses it towards the cell body
- Cells single lengthy fiber axon fiber passes the message through its terminal branches to other neurons or to muscles or glands. Dendrites listen and axons speak
- Axon: neuron extension that passes messages through its branches to other neurons or to muscles or glands
- Unlike short dendrites, axons can be very long EX: human neuron carrying orders to the leg muscle the axon is roughly in scaling a basketball attached to a 4 mile rope
- Electrical wire insulated, and some encased in myelin sheath
- Myelin sheath: fatty tissue layer segmentally encasing the axons of some neurons, enables vastly greater transmission spread as neural impulses hope from one node to the next - also speeds impulses
- Supporting the nerve cells are glial cells- neurons can not feed or sheathe themselves
- The provide nutrients and insulate the myelin, guide neural connections and mop up ions and neurotransmitters. Glia also plays a role in learning and thinking

- More complex the mammal, the higher concentration to glial cells to nerve cell ratio

#### Neural Impulse

- Neurons transmit messages when stimulated by signals from our senses or when triggered by chemical signals by neighbouring neurons
- Neurons fire an impulse called an action potential ( a nerve impulse; a brief electrical charge that travels down the axon)
- Neurons generate electricity from chemical event where ions are exchanged
- Fluid outside an axon is mostly positively charged sodium ions and a resting axons inside state is mostly negatively charged ions . This positive/negative state is called the resting potential
- Tightly guarded facility, axons surface is selective about what it allows through its gates.. Thus it is selectively permeable
- When a neuron fires the first section of the axon opens and its gates flip open. Positively charged sodium ions flood in. The loss of the inside/outside charge difference is called depolarization and this causes the next axon channel to open
- Like dominoes.. This temporary inflow of positive ions is the neural impulse - the action potential
- The resting phase is called the refractory period, the neuron pumps the positively charged ions back outside. Then it can fire again