Fact sheet 1.3 Early brain development

Learning aim C: Cognitive development from birth up to eight years

The importance of brain development in the early years

Over the past few years, neuroscience has helped us to understand more about children's development. Brain development in babies and children underpins their overall development. Brain development is also referred to as neurological development.

Neurons are the brain cells. A single neuron is of no use because what makes the brain work is the way that neurons connect together to transmit and receive electrical signals. It is these signals that operate and reflect our feelings, thoughts and actions.

Figure 1.2 shows a single neuron connecting to another. The connection is not a physical one as there is a tiny gap between the axon terminals and the dendrites of the other neuron. This gap is known as a synapse. Electricity seems to jump across this gap, almost like lightning. Although the diagram shows a single neuron, the reality is that there are billions of neurons and, at any given time, there will be millions of signals sent across the brain. Every new experience we have creates new connections between neurons within the brain.

At any time, there are millions of neurons firing off electrical signals, so the brain has ways of making sure that these signals can travel quickly.

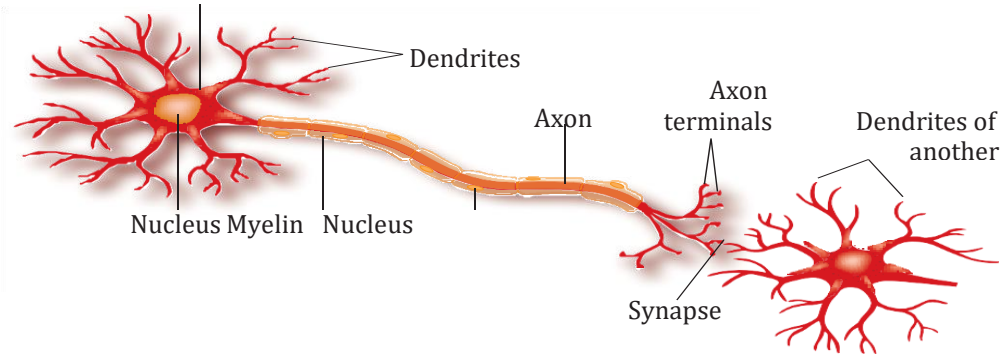


Figure 1.2 Neuron connecting to another neuron

Neural pathways

Repeated experiences and stimulation create stronger and longer-lasting connections between different neurons. These are known as neural pathways and have been likened to motorways because they allow the signals to move faster through the brain. Some neural pathways seem to be present at birth, but many others are formed as a result of repeated experiences.

Neural pruning

A process of pruning regularly takes place in the brain to remove these unused synapses. The first round of pruning takes place when children are 18 months old and is influenced primarily by genes and later on a child's experiences with environmental factors. If a child receives consistent stimulation synapses will grow but, for a child who receives little stimulation, further pruning takes place and fewer connections are retained. You may have heard the phrase 'children's minds are like sponges' and this is relevant particularly in the first few years of a child's life as, up until the age of around three years, the number of synapses is at a peak.

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