

Motor Neurons

Motor neurons stimulate muscle contraction. Sensory neurons transmit information from position sensors in the muscles so that movements can be coordinated and monitored.

The Elbow Joint

The elbow is a hinge joint because it moves in a manner resembling to the opening and closing of a door hinge. It is an example of a synovial joint. The capsule that seals the joint is lined by a membrane that secretes lubricating synovial fluid so that bones move smoothly against one another and friction is reduced.

Smooth cartilage covers the ends of the bones at the joint and also helps to reduce friction and absorbs pressure as the joint moves.

The elbow joint is made up of three bones the radius and ulna in the lower arm, and the humerus in the upper arm. Tendons attach the triceps and biceps muscles to these bones.

The biceps are attached to the radius and the shoulder blade. When it contracts the arm bends. The triceps are attached to the ulna, humerus, and shoulder blade, and it contracts to straighten the arm. The triceps and biceps are an example of antagonistic muscles.

The Knee and Hip Joints

The knee joint is another example of a hinge joint, and it moves in a similar way to the elbow, allowing movement in only one direction. The hip joint is a ball and socket joint, with the ball shaped head of the thighbone (the femur) fitting into a socket in the hip.

Ball and socket joints allow movement in more than one direction and also permits rotational movement.

Muscles

Skeletal muscle (striated muscle) is the muscle that causes the movement of our joints. Viewed under the light microscope, it has a stripped appearance made of multi-nucleate cells known as muscle fibres. Surrounding the muscle cell fibre is a plasma membrane called the sarcolemma. Each fibre is made up of many myofibrils running parallel to one another. If the skeleton is examined with an electron microscope, it is possible to see that surrounding each myofibril is a

For fertilisation to be successful many sperm cells must be present to penetrate the outer layers of follicle cells covering the secondary oocyte.

Only one sperm cell will break through and reach the plasma membrane to enter it. Fertilisation usually occurs in one of the oviducts, and is the moment when one sperm cell fuses with the secondary oocyte to form a zygote.

Pregnancy

Approximately twenty-four hours after fertilisation, the zygote begins to divide by mitosis. Mitosis continues and after about five days of division, produces a ball of around one hundred cells known as a blastocyst.

As these divisions are occurring, the ball of cells is moved down the oviduct towards the uterus and settles in the endometrium lining, where it plants itself and continues to divide and develops into an embryo.

Once the blastocyst has become established in the endometrium, it begins to secrete the hormone HCG. HCG travels in the bloodstream to the ovary where its role is to maintain the corpus luteum, the mass of cells that have developed from the empty follicle.

The corpus luteum produces progesterone and oestrogen, which in non-pregnant women maintain the endometrium into the menstrual cycle.

During pregnancy, it is important that the lining remain in place. HCG stimulates the corpus luteum so that it grows and continues to produce the hormones for the first three months of pregnancy. Thereafter, the placenta is fully formed and produces placental progesterone and oestrogen, so the corpus luteum degenerates.

The embryo grows and develops. After about one month it is only five millimetres long, but has a beating heart and the beginnings of a nervous system. From two months onwards it is known as a foetus. The foetus at this stage is thirty to forty millimetres long, and has recognisable limbs with developing bones.

The uterus lining provides nourishment for the early embryo, but the placenta forms from the endometrium and foetal membranes and by about twelve weeks it is fully functioning.

The foetus is connected to the placenta by the umbilical chord and is filled with a fluid sack called the amnion, which contains amniotic fluid. The foetus is supported in this fluid throughout its development and is protected by it from bumps and knocks, as the fluid is an effective shock absorber. Amniotic fluid also enables the growing foetus to move and develop its muscle and skeleton.