Can stem cells mend our broken hearts?

Some of our SciBar participants prepared this glossary, independently of Dr.Yvonne Alexander. Your feedback on the level of information and usefulness of the SciBar glossaries is most welcome.

Arteries Large blood vessels carrying blood away from the heart. Artery walls are both muscular (contain smooth muscle cells) and elastic (contain elastic fibres).

Adenovirus A type of virus which causes respiratory infections in man and animals. Modified forms can be used as a 'vector' to carry genes into cells during gene therapy. Size: about 1/10,000th of a millimetre.

Atherosclerosis The formation of fatty 'plaques' in the walls of arteries, which can impair the circulation. Plaques contain cholesterol and become calcified as they develop.

Cell division Most cells in the adult body, e.g. those in heart muscle or brain, are not dividing. However, other cells, e.g. those in skin or lining the intestine, are constantly worn away and need to be replaced by new cells. These new cells are produced by stem cells, which do divide.

Cardiovascular diseases Diseases of the heart and blood vessels.

Coronary arteries The small vessels supplying the heart with oxygenated blood. Their blockage can lead to a 'heart attack'. They may need to be unblocked or 'bypassed' in surgery.

Differentiated cell A body cell that has a particular structure and is highly specialised for its function is said to be differentiated, e.g. muscle cell. Normally, such cells do not divide.

Endothelial cells Flattened cells forming the internal lining (endothelium) of all blood vessels.

Gene therapy The use of DNA – often a functional gene – as treatment for disease, e.g. to replace a defective gene. The DNA must be transported into cells of the appropriate tissue to function.

Growth factors & cytokines Protein molecules, of many types, which can influence cell division and cell differentiation.

Metabolomics The analysis of small molecules (metabolites) generated during all the chemical reactions going on in the body (metabolism).

Proteomics The study of the complete set of proteins (proteome) formed by a cell or organism. Changes to the pattern of proteins formed may be linked to diseases.

Smooth muscle cells Found in the walls of many organs and most blood vessels. Their contraction is not under voluntary control.

Stem cells Have capabilities for unlimited division, to renew themselves and produce precursors of differentiated cells (see opposite). Stem cells can be derived from embryos or from adult tissues. Molecular markers are used to distinguish stem cells from other cells.

Systemic lupus erythematosus (SLE) A chronic inflammatory condition caused by an autoimmune disease that can affect the skin and organs. An autoimmune disease occurs when the body's tissues are attacked by its own immune system.

Telomeres The extreme ends of chromosomes (single piece of coiled DNA). Shortening of telomeres following cell division may be involved in ageing.

Useful weblinks:

Useful overview of medical uses of stem cells:
www.wellcome.ac.uk/About-us/Policy/Spotlight-issues/Human-Fertilisation-and-Embryology-Act/Stem-cell-basics/WTD040069.htm

Next SciBar: 14 May 2012. Sharks: Majesty or Monster? Time: 6.30pm as usual.