"Magna Graecia" University - Catanzaro

Master's Degree Course in Medical, Veterinary and Pharmaceutical Biotechnologies

Biochemical Program

(Integrated course of stem Cells, animal Models and

molecular and cellular Imaging)

AA 2018/2019

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What are stem cells, and why are they important?

Definition of stem cells. Unique properties of stem cells: ability of dividing and renewing themselves and possibility of giving rise to specialized cell types. Symmetrical and asymmetrical cell division. Stem cell classification: totipotent, pluripotent oligopotent, multipotent, and unipotent cells. Main stem cell: zygote. Embryonic stem cells. Embryonic stem cell discovery. What stages of early embryonic development are important for generating embryonic stem cells? How are embryonic stem cells grown in the laboratory? What laboratory tests are used to identify embryonic stem cells? How are embryonic stem cells stimulated to differentiate?

Different types of stem cells

Embryonic stem cells: what are embryonic stem cells? Where are they? What do they serve? Why can embryonic stem cells proliferate for a year or more in the laboratory without differentiating, but most adult stem cells cannot? Could be used to cure a disease? Adult stem cells: what are adult stem cells? Where are they? What do they normally do? What tests are used to identify adult stem cells? What is known about adult stem cell differentiation? Could be used to cure a disease? Fetal stem cells: what are fetal stem cells? Where are they? What do they serve? Could be used to cure a disease? Umbilical cord blood stem cells: what are umbilical cord blood stem

cells? Where are they? What do they serve? Could be used to cure a disease? Amniotic fluid derived stem cell: what are amniotic fluid derived stem cells? Where are they? What do they serve? Could be used to cure a disease? Induced pluripotent stem cells (iPSCs): what are iPSCs? Where are they? What do they serve? What are induced pluripotent stem cells? Could be used to cure a disease? What are the similarities and differences between embryonic and adult stem cells? What are the potential uses of human stem cells and the obstacles that must be overcome before these potential uses will be realized? Cancer stem cells. The cancer stem cell model. Cancer treatments based on animal models.