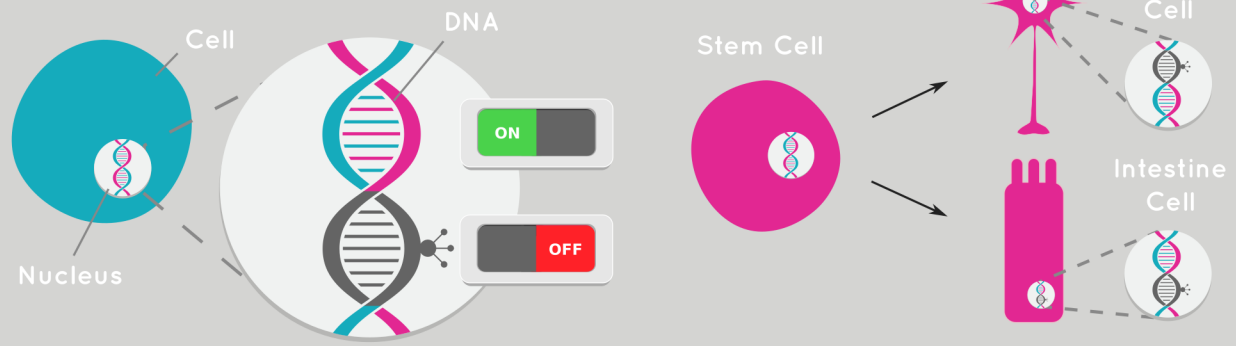
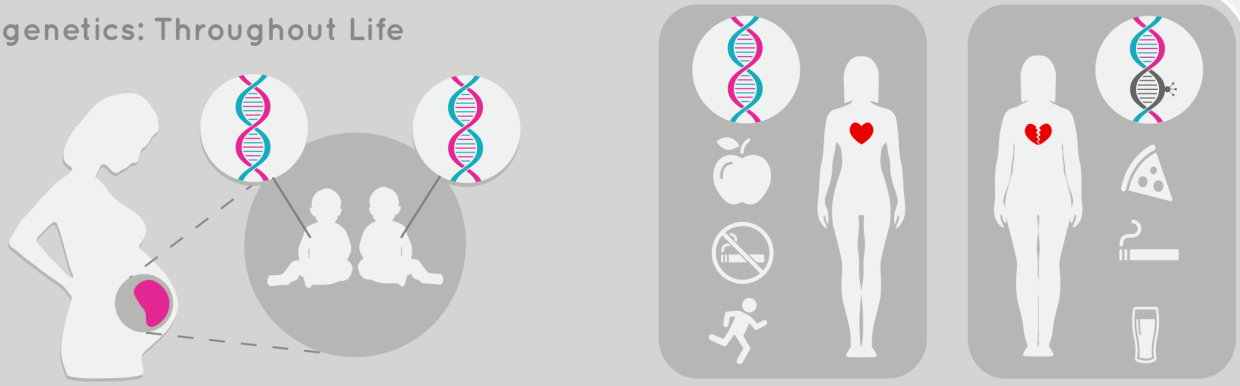
Epigenetics in Action

Epigenetics: The Basics



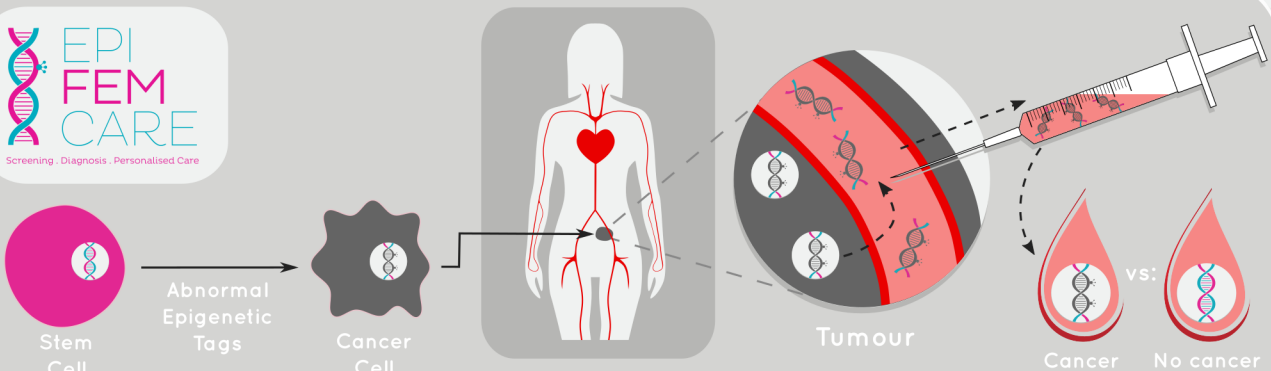
The DNA present in every cell of your body is the instruction manual directing all of the cell's functions. But our bodies are composed of many different cell types which look different and have specialised functions – for example, nerve cells look different and serve a different purpose to those in the intestine. This specialisation is made possible by epigenetic processes that allow or disallow specific parts of the DNA instruction manual to be interpreted. For instance the addition of an epigenetic 'tag' on top of DNA can cause a section of our DNA instruction manual (called a 'gene') to be switched off in one cell type whilst its absence in another cell type means this same gene remains switched on.

Epigenetics: Throughout Life



From conception and throughout a person's life, the epigenetic tags on their DNA are affected by their environment, lifestyle and behaviour. This is most clearly shown in identical twins who start life with the same DNA (picture left). Their epigenetic tags become increasingly different as they live their own lives resulting in different genes being switched on or off accordingly. Some of those genes affected can increase the risk for development of disease including heart disease or cancer. Sustained weight gain for example (picture right) is known to be associated with the development of women specific cancer.

EPI FEM CARE
Screening . Diagnosis . Personalised Care



The patterns of epigenetic tags in cancer cells are abnormal and in fact these patterns are thought to occur very early in the development of cancer. When a cell acquires these abnormal epigenetic patterns it loses its cell specific identity because the abnormal tags turn off the genes that instruct it to become specialised (for example to develop into a nerve cell).
As a tumour grows, it releases DNA into the blood stream. In the EpiFemCare project, we aim to identify tumour DNA in the blood by identifying characteristic patterns of epigenetic tags. We will use this information to improve pathways for screening, diagnosis and personalised care of breast and ovarian cancers.

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Find out more at www.epifemcare.eu