

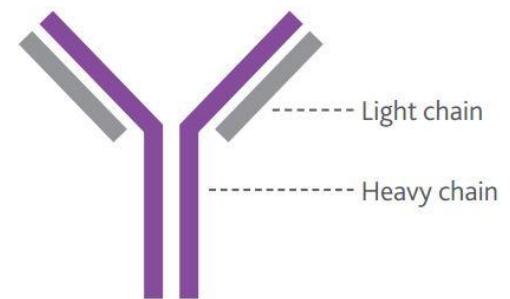
What is Myeloma, how is it currently treated and what future treatment is being researched?

Myeloma is a rare, incurable blood cancer affecting 17,500 people in the UK. It most commonly affects those over the age of 65 with only 2% of patients under the age of 40.

Antibodies:

- Protect the body from infection
- Consist of 2 light chains and 2 heavy chains
- 5 types of heavy chain - IgG, IgA, IgM, IgD, IgE
- 2 types of light chain - kappa (κ) and lamda (λ)

Structure of an antibody



Cause:

Myeloma is caused by mutations in the DNA causing plasma cells to produce abnormal antibodies called paraproteins which cannot fight disease. These antibody producing cells are called myeloma cells which multiply uncontrollably as they are cancerous. They fill up the bone marrow leaving less space for useful red and white blood cells, platelets and normal plasma cells. The most common forms of myeloma are IgG or IgA myeloma where the abnormal antibodies contain IgG or IgA heavy chains. IgM, IgD and IgE type myeloma are much rarer. In 20% of cases, the myeloma cells only produce light chains and not whole paraproteins.

Treatments:

1. Drugs – Chemotherapy drugs target rapidly dividing cells such as myeloma cells and kill them. These are often used in conjunction with steroids which can enhance the effect of chemotherapy as well as ‘novel agent’ (biological therapy) drugs which help the body control myeloma.
2. Stem cell transplant - After removal of most/all myeloma cells, a patient will have a stem cell transplant if healthy enough. This replaces cancerous myeloma cells with healthy stem cells often contributing to longer periods of remission.

Future development:

Adoptive T cell transfer is a process in which scientists are attempting to modify T cells (part of the immune system) to attack myeloma cells. This process involves filtering T cells out of the blood (apheresis) and genetically modifying them to recognise myeloma cells in order to kill them. This would be more effective than many drugs as T cells can last in the body for several years and multiply giving long term control over the disease. The most promising adoptive T cell thus far is known as chimeric antigen receptor (CAR) T cell and has been modified to display a receptor which can identify 1 or 2 specific targets on the surface of myeloma cells.

