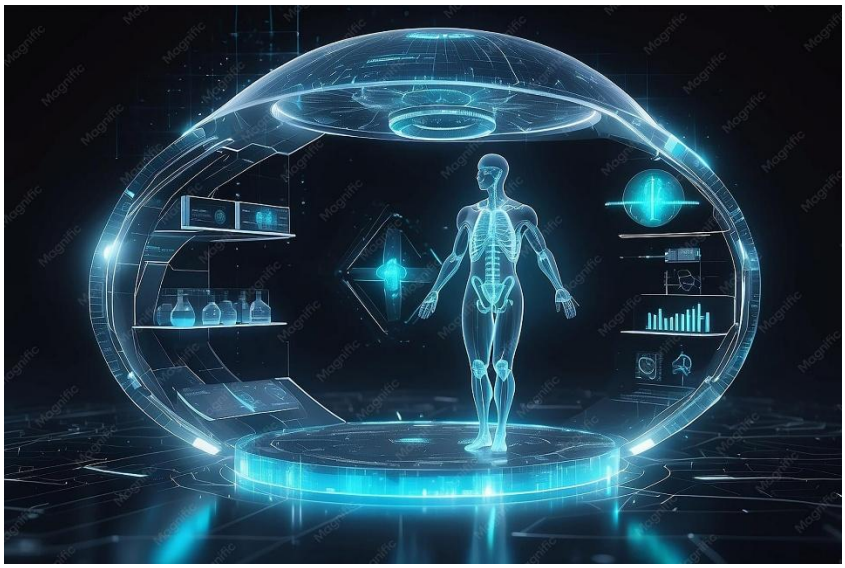
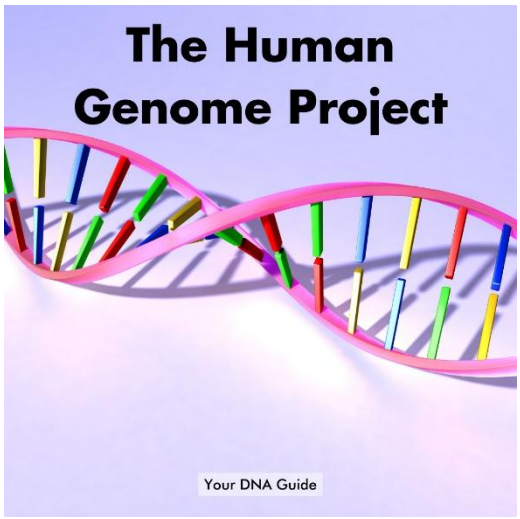
# Major Advances in Human Biology and Medicine in the Last 35 Years



Since 1991, our understanding of human biology and disease and its application to medical treatment has increased dramatically. Some of the key elements of these advances include the Human Genome Project, research on the Human Microbiome, new medicine technologies in particular Biologics and m-RNA vaccines, advances in understanding and treating cancer leading to an increase in 10-year survival rate from 35% in 1991 to over 50% in 2024, advances in research on brain physiology, stem cell research and most recently the use of AI to predict protein structure and create new proteins.

Some of these advances are described in more detail below

**The Human Genome Project**

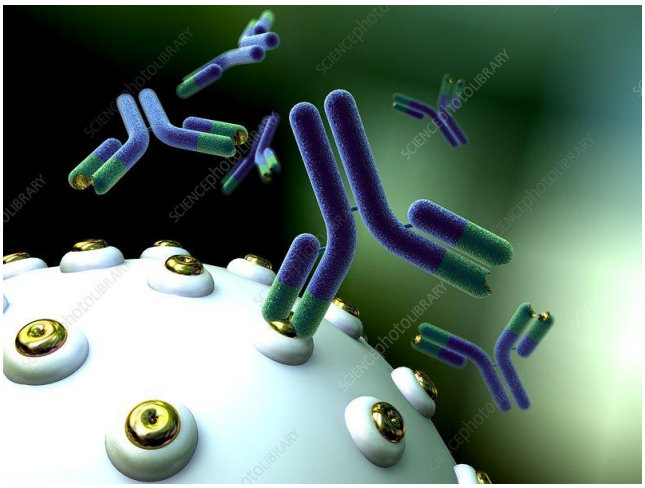



A global project running from 1990 to 2003 which mapped and sequenced all three billion base pairs of human DNA and decoded the complete genetic blueprint for a human being. The project led to major advances including development of technologies for rapid DNA sequencing, identification of specific genes responsible for inherited medical conditions, gene-editing methods, particularly the CRISPR-Cas9 technique, to delete or modify these genes and discovery of the RNA interference process which regulates gene expression but can be used to create medicines that shut down gene expression

# The Human Microbiome

The human microbiome is the collection of billions of microorganisms – bacteria, fungi and viruses – that live on and inside the human body primarily in the gut, skin and respiratory tract. Increasing research has shown that the gut microbiome in particular plays a crucial role in human health by aiding digestion, synthesising vitamins, supporting the immune system and protecting against harmful pathogens. Emerging evidence is linking the microbiome to cardiovascular and brain function as well as obesity and autism

# New Medicine Technologies



Medicines technology since 1991 has evolved rapidly moving from simple chemicals to complex biologics. The best examples of these are monoclonal antibodies (Mabs) and RNA-vaccines.

Mabs are protein antibodies made to specifically target proteins causing disease in particular autoimmune disease like rheumatoid arthritis, Crohns disease and ulcerative colitis. They are also under development as treatments for cancer for example, Amivantamab which was recently developed for treatment of advanced non-small cell lung cancer.

RNA-vaccines mimic a specific virus but are not pathogenic and train the immune system to recognise the virus. They can be designed and manufactured much faster than traditional vaccines and were produced in less than a year to provide vaccination against the Covid virus