

Researching genetic instability, a primary cause of cancer and inherited genetic disorders

Genome Damage and Stability Centre (GDSC), University of Sussex

Meeting Global Challenges

Genome instability underpins human health. Genetic Instability during cell division results in inherited genetic disorders. Instability of some cells is a primary cause of cancer which is exacerbated by environmental factors including sunlight and pollution. In addition to underlying cell mutation, genome instability pathways are the targets of many traditional cancer therapies and are attracting increasing interest for future medical treatments in cancer therapy.

A Multidisciplinary Approach

Studying the mechanism of genome instability and the consequences to organisms and cancer tissues when they are compromised is inherently inter-disciplinary. A specific strength of the GDSC is bringing together molecular, cellular and structural biology with state-of-the-art imaging and applying these distinct techniques across a range of experimental systems ranging from bacteria, through yeast and larger organisms. This work is complemented by studies on human cells and studying the consequences of a wide variety of rare genetic disorders in which patients have damaged specific DNA damage response genes.

Research Impact

- The GDSC publishes all its scientific research results in a range of internationally available journals. Our work informs the wider scientific community and is recognised as being at the international forefront.
- Basic research is being translated into phase I clinical trials to establish the efficacy of new treatment regimes for specific cancers. These regimes are designed on the basis of our understanding of cellular response to DNA damaging agents.
- Scientists from the GDSC sit on numerous funding bodies and national and international government advisory committees, for example on radiation protection.
- We provide a cellular diagnostic service for a number of rare genetic diseases which is used worldwide.

Funding Sources

- The GDSC was established with a combination of HEFCE, Wellcome Trust JIF initiative funding and an MRC centre development grant. Currently, funding comes from HEFCE, an MRC Centre Grant and a range of program and project grants to individual laboratories. Grant income is in the range of £3 million per annum and supports approximately 7 independent research fellows, 40 postdoctoral researchers, 15 predoctoral students and 10 technical staff. Grants are awarded by research councils major charities, specialist charities and the European Union.