

Genomic Uracil

Evolution, Biology, Immunology and Disease

This book describes genomic uracil in evolution, as a DNA constituent in adaptive and innate immune responses and as a mutagenic lesion causing cancer. Genomic uracil is as old as life and may have been a component in self-replicating molecules in the prebiotic era. The first living cells probably contained uracil in DNA, later to be replaced by thymine. The pioneering work of Nobel Laureate, Tomas Lindahl on spontaneous deamination of DNA cytosine to uracil was followed by his discovery of uracil-DNA glycosylase, which initiates repair of genomic uracil in base excision repair (BER). Uracil-DNA glycosylases are found in all forms of life and in DNA viruses, having roles in DNA repair, replication and epigenetics. The surprising discovery of enzymatic DNA cytosine deamination by the AID/APOBEC deaminases subsequently has implicated genomic uracil in the development of human cancer. The aim of the book is to contribute a reference text for graduate students, molecular biologists, immunologists and cancer biologists.

Genomic uracil has become a hot research topic of wide interest after the Nobel Prize in Chemistry 2015 was awarded for DNA repair (Paul Modrich, Aziz Sancar and Tomas Lindahl). Furthermore, genomic uracil has received wide interest among both immunologists and cancer biologists due to its unexpected and fundamental role in adaptive immunity. Genomic uracil, thus, is highly relevant to researchers in different areas of research, but to our knowledge there is no published text that treats genomic uracil in an interdisciplinary way. The authors of this book have in the last three decades worked on genomic uracil and its processing and are among the most highly cited authors in the field.

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