1. Record Nr. UNINA9910953550603321

Titolo	Colloquium on links between recombination and replication : vital roles of recombination / / Proceedings of the National Academy of Sciences
Pubbl/distr/stampa	Washington, D.C., : National Academies Press, 2000
ISBN	1-280-20993-3 9786610209934 0-309-58951-7
Edizione	[1st ed.]
Descrizione fisica	1 online resource (303 p.)
Soggetti	Genetic recombination Genomics
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di contenuto	""Colloquium on Links Between Recombination and Replication: Vital Roles of Recombination""; ""PNAS""; ""Contents""; ""Introduction Links between recombination and replication: Vital roles of recombination ""; ""Colloquium Historical overview: Searching for replication help in all of the rec places ""; ""THREAD 1: THE DISCOVERY OF RECOMBINATION GENES IN BACTERIA""; ""THREAD 2: IN VIVO CHARACTERIZATION OF BACTERIAL RECOMBINATION FUNCTIONS""; ""THREAD 3: EARLY LINKS BETWEEN REPLICATION FORKS AND RECOMBINATIONAL DNA REPAIR""; ""THREAD 4: Studies of the Bacterial SOS System"" ""THREAD 5: WORK ON BACTERIOPHAGE T4 DNA METABOLISM"""""" THREAD 6: ORIGIN-INDEPENDENT AND RDR RESTART DURING THE SOS RESPONSE""; ""THREAD 7: ISOLATION AND CHARACTERIZATION OF RECA PROTEIN AND PROKARYOTIC RECOMBINATION PROTEINS""; ""THREAD 8: RECOMBINATION MODEL DEVELOPMENT""; ""THREAD 9: EUKARYOTIC RECOMBINATION PROTEINS""; ""THREAD 10: THE RESTART (X174-TYPE) PRIMOSOME""; ""THREAD 11: TYING THE THREADS TOGETHER, GENETICALLY AND BIOCHEMICALLY""; ""THREAD 12: XERCD AND FREQUENCY ESTIMATES""; ""THE END MARKS A BEGINNING"" ""Colloquium Rescue of arrested replication forks by homologous recombination""""""DNA SEQUENCES, OR MUTATIONS THAT CAUSE REPLICATION ARREST, INDUCE DNA REARRANGEMENTS""; ""THE

REPLICATION FORK REVERSAL REACTION""; ""Colloquium Circles: The replication-recombination-chromosome segregation connection ""; ""Colloquium Participation of recombination proteins in rescue of arrested replication forks in UV-irradiated Escherichiaa€?""; ""A COMMON PATHWAY INVOLVING BOTH NUCLEOTIDE EXCISION REPAIR AND REC GENES""
""Colloquium Effects of mutations involving cell division, recombination, and chromosome dimer resolution on a priA2::kana €?""""""MATERIALS AND METHODS""; ""RESULTS""; ""DISCUSSION""; ""Colloquium RecA protein promotes the regression of stalled replication forks in vitro ""; ""MATERIALS AND METHODS""; ""RESULTS""; ""DISCUSSION""; ""Colloquium Topological challenges to DNA replication: Conformations at the fork ""; ""CONFORMATIONS OF NONREPLICATING DNA""; ""CONFORMATIONS OF REPLICATING DNA""; ""DOMAINS""
""Colloquium Rescue of stalled replication forks by RecG: Simultaneous translocation on the leading and lagging stranda€?""""""MATERIALS AND METHODS""; ""RESULTS""; ""DISCUSSION""; ""Colloquium Formation of Holliday junctions by regression of nascent DNA in intermediates containing stalled replicationa€?""; ""MATERIALS AND METHODS""; ""RESULTS""; ""DISCUSSION""; ""Colloquium Single-strand interruptions in replicating chromosomes cause double-strand breaks ""; ""MATERIALS AND METHODS""; ""RESULTS""; ""DISCUSSION""
""Colloquium Handoff from recombinase to replisome: Insights from transposition ""

Sommario/riassunto

There has been a sea change in how we view genetic recombination. When germ cells are produced in higher organisms, genetic recombination assures the proper segregation of like chromosomes. In the course of that process, called meiosis, recombination not only assures segregation of one chromosome of each type to progeny germ cells, but also further shuffles the genetic deck, contributing to the unique inheritance of individuals. In a nutshell, that is the classical view of recombination. We have also known for many years that in bacteria recombination plays a role in horizontal gene transfer and in replication itself, the latter by establishing some of the replication forks that are the structural scaffolds for copying DNA. In recent years, however, we have become increasingly aware that replication, which normally starts without any help from recombination, is a vulnerable process that frequently leads to broken DNA. The enzymes of recombination play a vital role in the repair of those breaks. The recombination enzymes can function via several different pathways that mediate the repair of breaks, as well as restoration of replication forks that are stalled by other kinds of damage to DNA. Thus, to the classical view of recombination as an engine of inheritance we must add the view of recombination as a vital housekeeping function that repairs breaks suffered in the course of replication. We have also known for many years that genomic instability-including mutations, chromosomal rearrangements, and aneuploidy-is a hallmark of cancer cells. Although genomic instability has many contributing causes, including faulty replication, there are many indications that recombination, faulty or not, contributes to genome instability and cancer as well. The (Nas colloquium) Links Between Recombination and Replication: Vital Roles of Recombination was convened to broaden awareness of this evolving area of research. Papers generated by this colloquium are published here. To encourage the desired interactions of specialists, we invited some contributions that deal only with recombination or replication in addition to contributions on the central thesis of functional links between recombination and replication. To aid the nonspecialist and

specialist alike, we open the set of papers with a historical overview by Michael Cox and we close the set with a commentary on the meeting and the field by Andrei Kuzminov.