**DNA REPAIR**

Fill in the gaps of the text with a suitable word, choosing from the ones below

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| initiated alterations introduced act means mark possess base damaged attached repair activated enable out microbial main process reversal parental strand methylated |

In view of the number of chemical and physical agents that can cause structural ……………… in DNA molecules, it is reassuring that all organisms, not least man, ……………… extensive mechanisms for repairing damaged DNA. DNA ……………. is a complicated subject, with at least 24 different proteins in *E.coli* being involved in correcting damage of one kind or another. The three ……………. types of repair mechanism are as follows:

***Direct repair*** involves the simple …………… of a structural alteration. It is not a common ………………. of DNA repair but there is one important example, called **photoreactivation**. Photoreactivation is carried by enzymes called DNA photolyases which, when ………………… by visible light, repair thymine dimers by cleaving the links responsible for the dimerization. DNA photolyases are known in bacteria, ……………. eukaryotes and plants.

***Excision repair*** is more complicated but is probably the main form of DNA repair in most organisms. It is ………………….. by any one of several enzymes that recognize and ……………….. a nucleotide that is ……………... The marker may be in the form of one or two single-stranded nicks adjacent to the damaged nucleotide, or may involve cleavage of the altered ……………. to produce an apurinic or apyrimidinic site. Many types of damage can be recognized, including thymine dimers. In the second stage of the repair ………………. a nuclease excises the damaged nucleotide along with a few of its neighbours, leaving a gap. The gap is then filled in by a DNA polymerase, with DNA ligase sealing up the polynucleotide.

***Mismatch repair*** *is* responsible for correcting errors …………….. during DNA replication. Again, there are enzymes that can recognize that something is wrong and either mark the mismatch or repair it directly. In order to do this the repair system must be able to distinguish the ……………. polynucleotide from the newly-synthesized daughter ………………. This is because the incorrect nucleotide will be in the daughter strand, so it is this strand that must be repaired, not the parent. In *E.coli* the distinction is possible because the parent strand is tagged with methyl groups, ………………….. to adenine nucleotides that occur within specific sequences (e.g., within the sequence 5-GATC-3). These modified adenines ……………. as labels that say “parent strand” and …………………………the repair enzymes to recognize which polynucleotide should be repaired at mismatch positions. The daughter strand will also become ……………. but not until sometime after synthesis.