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Do CRISPR or CRISPR-like Systems and Sequences Exist in Human Mitochondria or Evolutionary Disappeared in Human Cells?

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CRISPR (clustered regularly interspaced short palindromic repeats) and related genes (cas) or possible CRISPR-like gene transfer systems and related genes (especially short palindromic repeats are considered) may exist in human mitochondria (especially in hepatocytes and T-lymphocytes). Hereby, each type of CRISPR-Cas systems including I, II, III and IV or similar systems are considered. We should regard that human mitochondria is considered as the predecessor of the bacterium that is absorbed into mammalian cells by the anaerobic eukaryotic organism that is embedded in our cells as a result of evolution. (Cox et al., 2018; Dyall et al., 2014; Tielens et al., 2012; Lan et al., 2006) Human mitochondrial DNA (mtDNA) integrity might be also protected by CRISPR-Cas systems or CRISPR-like systems. Systems such as base excision repair (BER), mismatch repair (MMR), single-strand break repair (SSBR), microhomology-mediated end joining (MMEJ), and possibly homology recombination dependent repair (HRR) are still insufficient for understanding mtDNA integrity completely, and not inefficinet for designing novel detailed specific mapping of the protection mechanisms of mtDNA. Therefore, I want to mention that repeated CRISPR or CRISPR-like sequences should be considered and investigated in further mtDNA investigations. Furthermore, we also need to explore CRISPR or CRISPR-like systems in the human cell nucleus. Because the genes encoding mitochondrial proteins which responsible for the repair of mtDNA damage are nuclear-origin.

One of the mechanisms of protection systems against hepatitis virus types in hepatocytes may belong to CRISPR or CRISPR-like systems. Currently, certain antiviral protection systems for hepatocytes are not fully understood and not deeply investigated, and consequential investigations are needed for obtaining the precise results. CRISPR or CRISPR-like systems will play a major role in the development of more efficient diagnostic and therapeutic protocols and molecular biologic mapping of diseases related to genetical and epigenetical damages for next decades. Certainly, it is also important to consider ethical rules when exploring and applying

genome editing systems such as CRISPR or CRISPR-like system in human cells. As a result, it should be noted that CRISPR or CRISPR-like systems in human cells need to investigate, urgently. If the positive results indicate based on my idea, I will be so grateful for being part a role in encouraging further novel worldwide genomic and epigenomic studies and designing novel scientific approaches.

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