The Torch
Vol. 3 (30)

Potency of DNA hard drives

Poojhaa S

We have progressed a long way since the time of magnetic drums and floppy discs for electronic data storage. Data storage space has expanded by high orders of magnitude from tens of kilobytes to the petabyte range including cloud servers, thanks to technological breakthroughs. With this massive storage capacity comes the requirement for massive physical space to accommodate the server farms of the cloud. Scientists initially explored DNA molecules for data storage by implanting 35 bits of ones and zeros into the E. coli genome, producing a 5 by 7 square-bit image. Since then, numerous types of research were conducted to build DNA-based data storage devices, owing to the huge cost, energy, and space savings compared to running server farms. Surprisingly, it is predicted that all the data in the world may be stored in just a few grams of DNA. Synthetic biology provides scope for using DNA as storage devices and the scope can be used to create molecular recorders in cells, facilitating the storage and retrieval of information stored in the genetic material of the cell. Artificial DNA sequences can also be integrated into the cell's genome through CRISPR gene editing. Though the concept is giving so many promising features, it has its own development and implementation hurdles. Scientists attempted to create an automated DNA storage platform that would allow users to transfer photographs or music to DNA. They showed that their technology could convert a 5-byte Hello into a DNA sequence, manufacture, store, sequence the DNA and retrieve Hello. The entire procedure took 21 hours, and hence the implementation is impractical as of today. However, given the rapid pace at which such technologies are created, it is not surprising to see the technology being accessible in the near future.

Keywords: DNA-based data storage, Genome, Storage space, Bytes, Sequence

Citation:
Poojhaa S. Potency of DNA hard drives. The Torch. 2022. 3(30). Available from:
https://www.styvalley.com/pub/magazines/torch/read/potency-of-dna-hard-drives.