

# INTERSTELLAR INFORMATION TRANSPORT WITH DNA DATA STORAGE AND BACTERIAL SPORES

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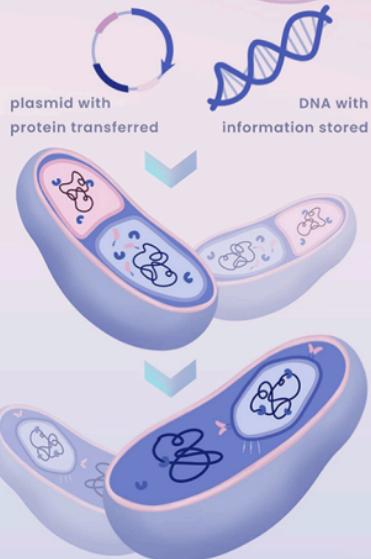
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## BACKGROUND

Space travel and interstellar migration have always been the wildest dreams of mankind, as we embrace a new stage of aerospace engineering, what once existed only in dreams seems to be just around the corner. However, when considering new technologies that enable human to travel through space or even migrate to another planet, information transportation which guarantees the continuation of our civilization is fundamental yet easily overlooked.

Keeping this problem in mind, we thus explore synthetic biology techniques served as a bridge between the promising DNA data storage technology and interstellar communication in this amazing summer!



## SECTION 1



### DNA DATA STORAGE

DNA is a promising data storage medium due to its remarkable durability and space-efficient storage. The rapidly evolving DNA data storage technology is a comparatively practical method for massive information transporting across space.

## SECTION 2

### SPORE DISPLAY AND MODIFICATION

Spores of *Bacillus subtilis* which have the intrinsic tolerance to extreme environments and capability to integrate large amounts of heterogeneous DNA are selected as carriers of information transported across the space. Spore Display System provides a way to modify spores with tyrosinase and melanin-binding-peptides which produce the melanin-coated surface. Dsps proteins from the famous Tardigrade, on the other hand, associate with the bacterial genome internally for a physical protection.

## HIGHLIGHTS

Generally, with the help of synthetic biology, we explore the possibility of tackling interstellar communication problem utilizing DNA data storage, improve the adaptation progress with engineered bacterial spores and introduce a new application scenario to the bright prospect of DNA data storage.

Specifically, algorithms focused on improved encode and decode strategies are achieved, spores exhibiting tyrosinase and melanin-binding-peptide alike are produced and information contained in better radiation-proof spores is efficiently protected.