



in silico Designed Enzyme Library for Industrial Use

Enzyme / Food & Beverages / Chemistry

digzyme, Inc

Outline of Research and Development

● Background

Industrial enzymes are widely used in fields such as food processing and chemical synthesis, but most commercially available enzymes are derived from natural sources, limiting their variety. End-users often have to choose from existing products to find an enzyme that suits their needs, but these enzymes frequently fail to meet their requirements. At our company, we leverage *in silico* technologies to design enzymes with unique properties not found in commercial products.

● Research and Development

We conduct *in silico* screening of protein sequence sets obtained from public databases and generative models to identify candidate sequences that match the desired properties. The selected sequences are synthesized into DNA and genetically engineered into microorganisms. Following expression and enzyme evaluation, we build a library to facilitate the development of optimized enzymes.

● Results

As our first project, we developed a lipase library optimized for chemical synthesis, featuring excellent heat and solvent resistance. These lipases can form and exchange ester and amide bonds even in non-aqueous environments. In tests involving synthesis of target compounds for our clients, we identified enzymes that outperformed the widely studied commercial enzyme CalB, including some with significantly higher heat resistance.

● Future Outlook

In the future, we plan to expand our enzyme library beyond lipases to include enzymes that break down proteins and carbohydrates for food processing, as well as oxidative enzymes capable of decomposing wastewater and waste materials. These enzymes are in high demand for industrial applications, with significant potential for further development, offering solutions to meet a broader range of needs.

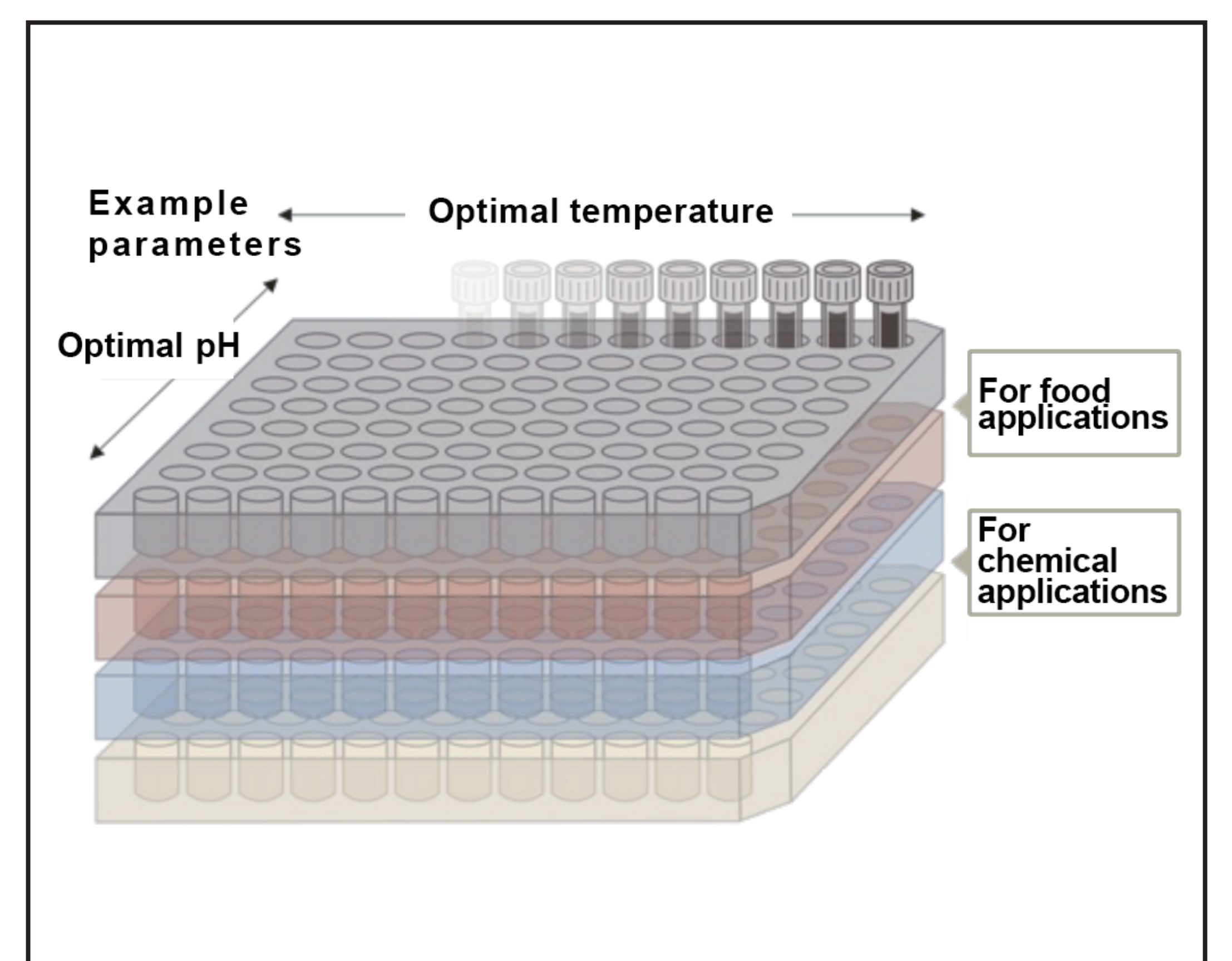
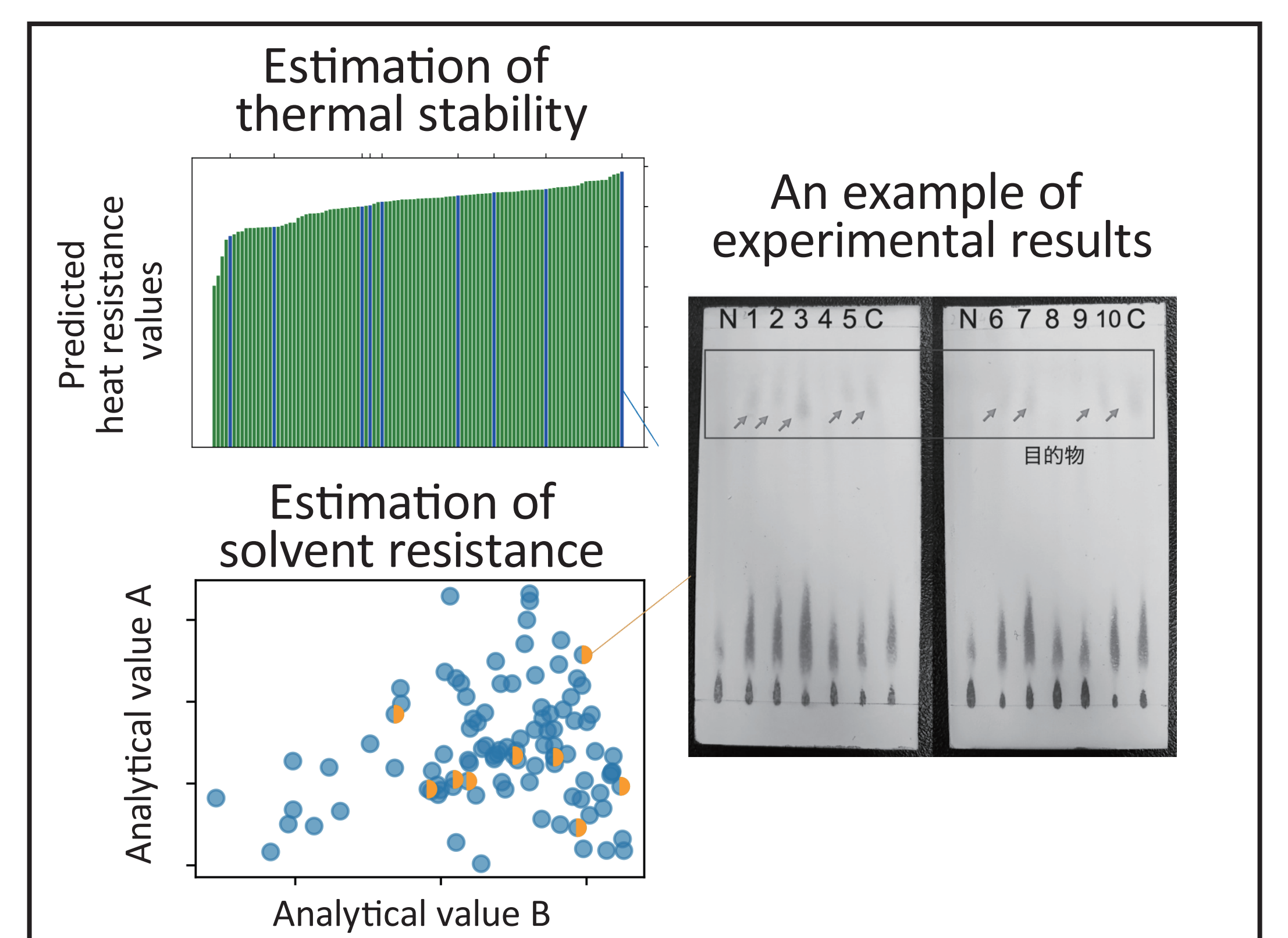


Image of "digzyme Designed Library™"



Design and validation results of the lipase library

For Visitors

Through this exhibition, we are seeking partners to collaborate on the practical application of our enzyme technology. Our innovative enzymes have the potential to address previously unexplored needs for which commercial solutions are limited, with promising applications in food processing, environmental sustainability, and chemical synthesis. We are looking for opportunities to meet diverse industrial demands through joint research and business matching.

Related Site Introduction

● digzyme WEBSITE
<https://www.digzyme.com/>



● PRTIMES
<https://prtjmes.jp/main/html/rd/p/00000013.000050097.html>



Project Name

Deep-Tech Startups Support Program(DTSU)

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