A Novel Database to Reduce Unsuccessful Cloning in E. Coli by Detection of Toxic Genes

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Summary

Synthetic genes are commonly used in academic and industrial applications, however in many cases these said genes can be toxic when inserted into the ubiquitously used E. coli. This is problematic as time and money is wasted on attempts to generate genes that will not function in E. coli. The problem is exacerbated as in many cases it is known whether a gene is toxic until it is inserted into the microorganism. Therefore it would be of great value if genes could be pre-screened to determine toxicity or general stability within E. coli. Â The present technology offers a method to save time and money by avoiding problematic clonings. The PanDaTox database can predict the toxicity or â€œunclonabilityâ€ in E. coli of over one and a half million genes from nearly four hundred different microorganisms.

Applications

- Save time and money by avoiding problematic gene syntheses.
- Design better metabolic pathways for synthetic biology applications by finding genes that can function together.
- Antibiotic targets by using the database to find novel toxic compounds that can as anti-microbial agents.

Advantages

- **Simple** â€“ the PanDaTox database is simple to use with a straightforward user interface.
- **Extensive** â€“ the database covers around 1.5 million different genes from close to 400 different microorganisms.
- **Detailed** â€“ including exhaustive amounts of information such as taxanomy, protein information, results of previous experiments (when available), and more.

Technology's Essence

The invention relates to PanDaTox a unique system using an algorithm and database to predict whether genes are toxic in E. coli. The system functions by comparing annotated genomes with different runs of whole genome sequencings of different microbial species. By comparing which portions of the genome were successfully cloned previously into E. coli, PanDaTox can now predict the inherent toxicity of different genes or genetic elements.