

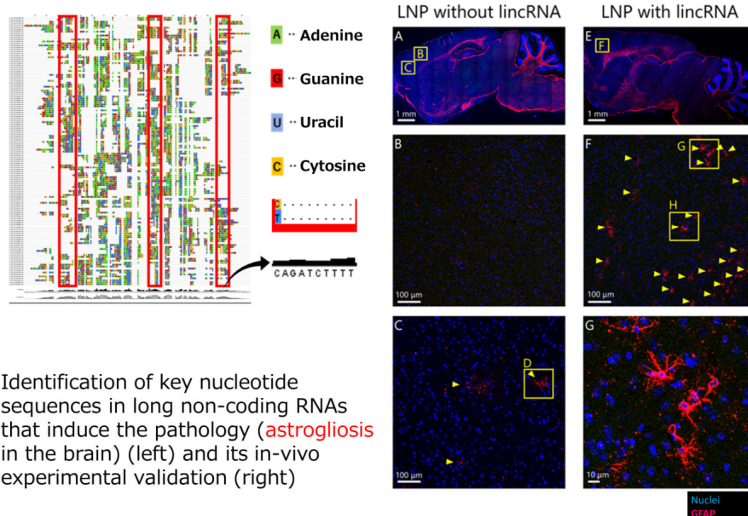
Purpose of Research

Long noncoding RNAs (lncRNAs; >200 nts in length) are major transcripts that are not translated into proteins like microRNAs (approx. 25 nts). Although a large number of their expression profile data have been collected, they are rarely analyzed or discussed due to the lack of analysis techniques for lncRNAs. We are working to elucidate the functions of lncRNAs by utilizing machine learning and various statistical analysis methods on RNA expression profiles from diverse tissues and cells.

Summary of Research

Using mouse transcriptome data from regions critical for waste clearance and microenvironment regulation around blood vessels in the brain, we identified lncRNA fragment sequences contributing to the induction/suppression of Alzheimer's disease-like abnormal structural protein accumulation model lesions. We have also identified a group of lncRNAs whose expression are altered in human colorectal cancer and are exploring their target molecules. Their molecular targets are of interests.

Extraction of functional lncRNA fragment sequences based on machine learning of RNA expression profiles



Points

- Focus on NON-CODING RNAs LONGER than “microRNA” (the 2024 Nobel Prize topic)
- A vast amount of unanalyzed and unexamined data exists worldwide

Future Developments

- lncRNAs that can suppress the brain perivascular regions will be identified.
- lncRNAs that can colorectal cancer, as well as fatty liver, will be identified.

Comparison with Conventional or Competitive Technologies

- lncRNA analysis techniques are limited. We can enhance the analysis by machine learning.

Expected Applications

- Elucidating the functions of lncRNAs is expected to lead to their application in nucleic acid therapeutics.

Challenges in Implementation

- The challenge that requires supports lies in the approval of nucleic acid therapeutics.

What We Expect from Companies

Collaborations with people interested in utilizing large amounts of unanalyzed transcriptome data (including machine learning) are welcome.

- Award: Young Investigator's Award (Bioimaging Society of Japan)
- Refs for the brain perivascular lesion:

