Docket #: S12-488

Anticancer fragment: Depletion of a tsRNA induces cell death

Researchers in Dr. Mark Kay's lab have developed a patented approach to inducing apoptosis that could represent a new strategy against cancer and other diseases. tRNA-derived small RNAs (tsRNAs) are an abundant class of small non-coding RNAs, but their biological role is not well understood. The inventors have found that depletion of tsRNA derived from LeuCAG-tRNA induces apoptosis. Apoptosis, genetically programed cell death, plays an important role in normal tissue development and homeostasis. Defects in apoptosis are thought to contribute to a wide range of human diseases. The methods and compositions provided offer a new therapeutic approach for treating a variety of diseases including cancer.

Stage of Development
The inventors have shown that depletion of tsRNA derived from LeuCAG-tRNA induces apoptosis. Decreasing the levels of this tRNA fragment with an antisense oligonucleotide can slow the growth of liver tumors in mice and, potentially, might be useful in treating human cancer.

Applications

- Therapeutic development for:
    - Cancer
    - Autoimmune disease
    - Hyperplasia
    - Macular degeneration

Advantages

- New approach to inducing apoptosis

- New avenue for therapeutic development
- New role for tsRNA

Publications

- Kim, H. K., Fuchs, G., Wang, S., Wei, W., Zhang, Y., Park, H., Roy-Chaudhuri, B., Li, P., Xu, J., Chu, K., Zhang, F., Chua, M., So, S., Zhang Q.C., Sarnow, P., & Kay, M. A. (2017). A transfer-RNA-derived small RNA regulates ribosome biogenesis. *Nature, 552*(7683), 57-62.
- Kim, H. K., Xu, J., Chu, K., Park, H., Jang, H., Li, P., Valdmanis, P.N., Zhang Q.C., & Kay, M. A. (2019). A tRNA-derived small RNA regulates ribosomal protein S28 protein levels after translation initiation in humans and mice. *Cell reports, 29* (12), 3816-3824.

Patents

- Published Application: 20140323555
- Published Application: 20170044530
- Published Application: 20200199594
- Issued: 9,428,537 (USA)
- Issued: 10,633,655 (USA)

Innovators

- Hak kyun Kim
- Mark Kay
- Shengkai Wang

Licensing Contact

Sam Rubin

Licensing Associate, Life Science

Email