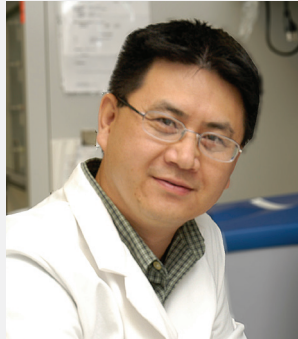


## miRNA-based biomarkers and therapeutics for cancer

Dr. Ju's research at Renaissance School of Medicine, Stony Brook University focuses on elucidating the mechanism of translational control mediated by noncoding RNAs in cancer and translating the new discovery to clinical cancer diagnosis and therapy. His group is the first to discover that p53 regulates the expression of certain miRNAs, opening a new frontier in cancer research. Dr. Ju's group is actively investigating the mechanism of miRNAs in proliferation, cell cycle control, chemoresistance to fluoropyrimidines and antifolates in tumor stem cells, and epithelial-to-mesenchymal transition. His group is also developing novel approaches to study posttranscriptional control mediated by miRNAs and RNA-binding proteins. They are also interested in translational research and the investigation of miRNAs as biomarkers in cancer diagnosis and prognosis.



**Jingfang Ju, PhD**  
**Professor, Renaissance School of Medicine**  
**Stony Brook University**

**Jingfang Ju:** My research focus is to discover anticancer drug-resistance mechanisms regulated by noncoding RNAs, with the long-term goal of developing miRNA-based biomarkers and therapeutics for cancer.

**Thermo Fisher:** Which one excites you the most?

**Jingfang Ju:** We are at the best time in human history to discover treatments for human cancers, with the power of high-throughput genomics and proteomics technology and the computational power to better understand the complex nature of human diseases. We are at the quantum-leap phase to come up with new therapies for cancer.

**“We are at the quantum-leap phase to come up with new therapies for cancer.”**

**Thermo Fisher:** What is your research goal?

**Jingfang Ju:** Our research goal is to understand the impact of epigenetics in cancer chemoresistance mechanisms such as apoptosis, autophagy, cancer stemness, and epithelial-to-mesenchymal transition. We have discovered a number of tumor-suppressive miRNAs with either reduced or lost expression in colorectal cancer, gastric cancer, and pancreatic cancer. We are focusing on design and development of miRNA-based cancer therapeutics.

**Thermo Fisher:** What is one of your biggest challenges?

**Jingfang Ju:** The major challenge for miRNA-based therapeutics is delivery. We have made some novel modifications of miRNA so that they can be delivered vehicle-free to cancer cells *in vivo*. We think this represents a major advancement in miRNA-based therapeutic development.

**Thermo Fisher Scientific:** Can you please briefly introduce yourself?

**Jingfang Ju:** I am currently a professor in the Department of Pathology and co-director of the Translational Research Laboratory at Renaissance School of Medicine, Stony Brook University. I received my PhD training in biochemistry and molecular biology at the University of Southern California, and post-doctoral training in molecular pharmacology at Yale School of Medicine, Yale University.

**Thermo Fisher:** Can you provide an overview of your research projects?

## Thermo Fisher: Why miRNA?

**Jingfang Ju:** There are a number of unique advantages to using miRNAs as therapeutics for cancer. The mechanism of drug resistance is quite complex in cancer. As a result, single-targeted strategies often provide a limited survival benefit, and tumor cells quickly develop resistance. As miRNAs are multitargeted entities by interacting with a number of mRNA transcripts, they will provide multitargeted inhibitors, which is a dream for anticancer drug development.

**“As miRNAs are multitargeted entities by interacting with a number of mRNA transcripts, they will provide multitargeted inhibitors, which is a dream for anticancer drug development.”**

**Thermo Fisher:** What is the potential importance of miRNAs as biomarkers in cancer research?

**Jingfang Ju:** There are a number of advantages to using miRNA-based biomarkers in cancer research. First, the number of candidate miRNAs is much smaller than protein-coding mRNA transcripts. So, we started with a smaller pool of candidates. The second advantage is the high stability of miRNAs, especially in formalin-fixed, paraffin-embedded (FFPE) tissues and body fluids.

**Thermo Fisher:** What is the current state of gastrointestinal (GI) cancer research?

**Jingfang Ju:** There have been some tremendous advancements made in GI cancer research in recent years. A number of targeted therapies have been developed. The impact of immunotherapy in GI has also been demonstrated in certain patient cohorts. We have a much better understanding of cancer resistance mechanisms, and that has opened up multiple frontiers for scientists to develop novel approaches to treat the disease.

**“We have a much better understanding of cancer resistance mechanisms, and that has opened up multiple frontiers for scientists to develop novel approaches to treat the disease.”**

**Thermo Fisher:** How does Thermo Fisher Scientific fit into your workflow?

**Jingfang Ju:** Thermo Fisher has a number of gene expression analysis platforms, such as Applied Biosystems™ TaqMan® Assays and tools for sequencing analysis. These are quite powerful for us to discover and verify miRNA-based biomarker or therapeutic candidates.

**“Thermo Fisher has a number of gene expression analysis platforms... These are quite powerful for us to discover and verify miRNA-based biomarker or therapeutic candidates.”**

**Thermo Fisher:** How did you decide on using TaqMan Assays?

**Jingfang Ju:** Our lab has been using TaqMan Assays for quantifying mRNA and miRNA expression analysis for over 15 years. They are a reliable, sensitive, and robust expression analysis technology with high specificity.

**Thermo Fisher:** What do you look for in a gene expression solutions provider?

**Jingfang Ju:** I am looking for a technology platform that is user-friendly, robust, and cost-effective, with a high level of detection sensitivity.

**Thermo Fisher:** What are the future directions of your research project(s)?

**Jingfang Ju:** We will focus our efforts on developing miRNA-based therapeutics and hopefully translate them to clinical management in the near future.

**Thermo Fisher:** Finally, what advice would you give to a young scientist considering a career in your field?

**Jingfang Ju:** My advice is to have a clear vision with high motivation and an open mind.

Find out more at [thermofisher.com/gexscientistspotlight](https://thermofisher.com/gexscientistspotlight)

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