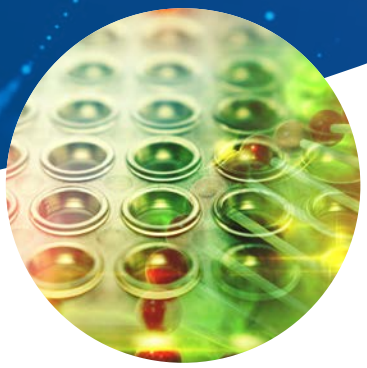
CUSTOMER SPOTLIGHT



Using DNA/RNA extraction to study rare genetic diseases has rarely been this efficient at BridgeBio

Jeremy Rouse
Research Scientist at BridgeBio

In 2023, as the world celebrates the 70th anniversary of the discovery of DNA, **Jeremy Rouse**, research scientist at **BridgeBio** in Raleigh, North Carolina, reflects on the role this discovery played in his career.

"The discovery of DNA shaped my career from the beginning," he says, "from understanding the importance of plant genes for better crop yields, to my current role, where the understanding of rare genetic diseases might lead to improvements in peoples' lives – many of whom couldn't even have been *diagnosed* 70 years ago."

More specifically, Jeremy's current role at BridgeBio centers on gene therapy analytics via animal biodistribution studies for uncommon genetic diseases.

Key to his research is understanding the precise number of viral vectors delivered to the target tissue, and the level of transgene expression. That data enables Jeremy and his team to accurately evaluate the efficacy of a gene therapy approach, and make informed decisions about potential strategies for optimizing a therapy to achieve maximum benefit.

His team's current workflow requires high-throughput sample preparation—including nucleic acid purification, quantification, and qPCR to determine vector genome count and RNA expression.

Jeremy himself is no newcomer to nucleic acid purification. In fact, it's the first skill he learned in the lab almost 25 years ago, when he used phenol/chloroform to extract nucleic acid from plants. At that time, his lab typically processed thousands of samples weekly, then set up PCR before running agarose gels to assess the target bands. It was a time-consuming process.

In contrast, today, automated nucleic acid extraction can be done in about 20% of the time it used to require.

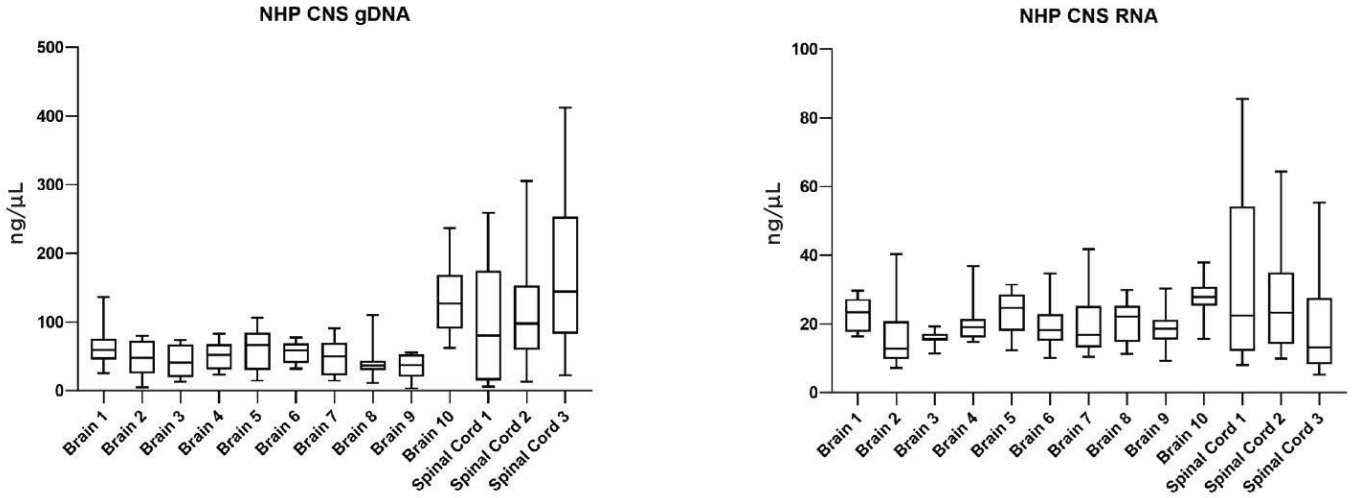


Figure 1. Average gDNA **(left)** and RNA **(right)** yield from brains and spinal cord collected from a non-human primates model, using SPRI bead-based nucleic acid extraction reagents from Beckman Coulter Life Sciences.

"Now one person can set up and run a 96-well plate in under an hour," Jeremy explains, "and then have their time free to run other experiments in the lab. Previously, it would have been a challenge to complete 96 samples in 8 hours, and the process would be 100% hands-on."

Thanks in part to this significant time-savings, Jeremy's team can move quickly from testing a specific gene therapy in animal models to evaluating its effectiveness. There's no need to wait for a Contract Research Organization to process their samples, which could take months. Equally important, in an era of lab tech shortages, Jeremy can keep his team lean, and they can all spend more time doing important research rather than sample preparation.

Higher efficiency plus yield and consistency

Jeremy and his team use SPRI bead-based nucleic acid extraction reagents from Beckman Coulter Life Sciences because performance, reproducibility and automation-compatibility are essential for his research.

"The SPRI-based beads enable simultaneous DNA and RNA extraction, which avoids splitting our valuable samples, and maximizes nucleic acid recovery," Jeremy says.

"For example, (the) gDNA and RNA yields from our tissue samples from non-human primates **(Figure 1)** passed the minimum yield requirement for downstream tests.

"As for reproducibility, we know that we will get consistent results, and (we) don't have to worry about differences and how users follow a protocol."

Collaboration: key to developing an efficient protocol

When it came time to evaluate and develop their automated extraction method and protocol, Jeremy leveraged the scientific expertise of a team from Beckman Coulter Life Sciences.

"I was able to lean on the team at Beckman that developed the purification protocol and use their knowledge to adapt (it) to the automated method," he says.

He was well aware that magnetic bead-based extraction is fairly easy to automate on almost any liquid handler – and that both column- and bead-based methods could meet their basic criteria. The latter method, however, offered him and his team other important benefits.

"In our case, we need scalability, which we found the (Beckman Coulter) bead-based method to be better at. In addition, the lysis method for beads gave us more flexibility with tissue (types) we can lyse. For example, with a column-based method we needed a different kit for tough-to-lyse tissue, like skeletal muscle or spinal cord.

"And instead of relying on trial and error," he adds, "we worked closely with the Beckman team to help increase our confidence that we were moving in the right direction. And, we were able to have some of our samples tested by Beckman's proof-of-principle team using analysis tools we don't currently have."

Because this collaboration resulted in such an efficient process—as well as actionable results—Jeremy is already considering other collaborative projects with Beckman Coulter Life Sciences.

Keeping eyes on the (rare) prize

While Jeremy says he's enthusiastic about any opportunity to use his problem-solving skills in a hands-on way for adapting or developing new assays, it's the big picture that matters to him most.

"What has kept me here is the potential to *help* people as a result of the work we're doing in the lab. We have a philosophy at BridgeBio of *putting patients first*. I think that permeates down to even the small decisions I make on a daily basis, as we research gene therapies that have the potential to treat rare genetic diseases that have (always) had limited treatment options."

Beckman Coulter Life Sciences was proud to provide support for this BridgeBio research project. Learn more about our genomic reagents at **www.beckman.com/reagents/genomic**

Interested in collaborating with us? Learn more at **www.beckman.com/reagents/genomic/%20collaboration-grant-program**

For Beckman Coulter's worldwide office locations and phone numbers, please visit Contact Us at **beckman.com**.
2023-GBL-EN-101859-v1