

# Automating Homogenization of 2 mL Samples for Bioanalytical Analysis

## LH 96 Automated Homogenizer and Liquid Handling Workstation

### Introduction

After completing his chemistry degree at University of California, San Diego, Dallas McCassalin joined the Bioanalytical Group at Regulus Therapeutics where he uses the LH 96 Automated Homogenizing and Liquid Handling Workstation to process nearly 500 liver and kidney samples each week in tiny 2 ml tubes.

#### **Q: What is the goal of the Bioanalytical Group at Regulus?**

**A:** Our group is responsible for examining pharmacokinetics or miRNA based therapeutics, with a particular focus on their absorption by the hepatic and renal systems. In a week we will process 100-500 tissue samples with homogenization, liquid-liquid extraction, and LC/MS. Being able to process large numbers of samples allows results to be obtained in a timely manner, supporting downstream decision making for our organization.

#### **Q: How did you process samples before the Omni LH 96?**

**A:** Before the LH 96, we manually homogenized all of our tissue samples using a hand-held homogenizer. This was a very labor intensive process, which required us to weigh each sample, manually add the appropriate amount of homogenization buffer, manually homogenize the mixture, and then pipette the homogenate from the 2 mL tube used for preparation to a 96 well plate for further experimentation. Working efficiently, this process took approximately 3 days for us to process 200 samples from homogenization through analysis. In addition to the length of the process, the opportunity for human error was a concern to us.

#### **Q: What interested you most about the LH 96?**

**A:** We were interested in reducing the processing time in our sample preparation, improving the overall efficiency of our workflow. The ability to load the LH 96 with tissue samples without having to weigh out samples, calculate buffer volumes, or manually homogenize was very alluring to us. The walk away factor was the most attractive aspect of the LH 96. If the LH 96 was handling all the homogenization sample preparation, our team would be freed up to prepare for other downstream experiments for the homogenate while the LH 96 was creating it. The LH 96 compressed the homogenization process in a way that allowed us to develop parallel workflows versus one linear process for our sample analysis. Additionally, the reduction in human error through the implementation of a fully automated sample preparation process was an enticing byproduct of the LH 96. When examining pharmacokinetics in the drug development process, it is critical that results are accurate and



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reproducible. Anytime we can implement a device, such as the LH 96, that improves workflow efficiently while consistently producing accurate results, it is highly desirable in drug development work and high throughput screening (HTS).

**Q: Now that you have implemented the LH 96, how has your workflow changed?**

**A:** Implementing the LH 96 into our daily workflow has reduced stress on our group, providing extra time during sample prep to establish parallel workflows around our samples versus the linear one we previously had. While the LH 96 is taking care of the sample prep, we are able to prepare for our downstream processes like establishing the run sequence, managing the plate maps, and ensuring the calibration curve for analysis. The LH 96 has reduced our overall processing time by 33-50% depending on the samples, saving us days in the total workflow timeline and maintaining accuracy in our data.

**Q: How did you customize the LH 96 for your needs?**

**A:** Omni customized our LH 96 to accommodate homogenization in 2 mL tubes and integrated tubing that was compliant with handling our organic solvent. Omni found solutions for everything we asked for. The engineering department and sales representative worked diligently with us to ensure that the LH 96 would work for our process, rather than forcing us to modify our process to fit their machine.

**Q: How was automating homogenization for 2 mL tubes?**

**A:** Our softer tissues, such as hepatic tissue was transferred very easily to 2 mL tubes for automated homogenization. I simply place our liver samples in the LH 96 and go about my day. Processing tissues with denser concentrations of connective tissues, such as kidney samples with mechanical shear in a 2 mL tube was initially a challenge. As soon as we expressed our difficulty with renal tissue processing, Omni engineering redesigned the liquid handling portion of the machine with a cooling tray to meet our requirements and the kidney processing became as seamless as working with our softer tissues. Thanks to the Omni team, the LH 96 can process any tissue sample we have in our smaller 2 mL tubes to constantly produce uniform homogenate without issue.

**Q: How easy is it to operate the LH 96?**

**A:** The user interface for the LH 96 is very user friendly. You turn on the machine, open the program, choose the profile you want, link the weights file, push play, and walk away as the LH 96 takes care of your sample preparations. The software is easy to use on a regular basis and the machine itself is reliable in its operations. I have not had a day where this machine has gone down and disrupted my workflow.

**Q: How is it working with Omni?**

**A:** Omni is an attentive and active group to work with, responding to questions in a timely manner and working diligently to ensure their device worked with our processes. Before we ordered the LH 96, Omni invited my supervisor to their headquarters in Atlanta to see a demonstration of the device and get a better understanding of our needs and the capabilities of this device. They also provided a demonstration of the LH 96 for our group via webcast. When the instrument arrived, Omni had it set up in one day, trained our group the next day, and optimized the device set up within our process. They ensured we were all comfortable with the device before leaving and are readily available if we have any questions. I interact with the Omni team about once every other month. I have no problem emailing any of them and always get a prompt response, always within 48 hours of my initial email. It is nice to work with a company that you do not have to chase around to get answers or support from. They are a quality group to work with, having a very trustworthy and personable team to assist customers. The staff at Omni wants to get the job done so you can get your job done and they have the knowledge and expertise in the field to do so.



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