

Exercise Worksheet: Writing a Comprehensive Script for an Automated Liquid Handler

Introduction

In this task, your group will create a detailed experimental script for an automated liquid handler, designed to synthesise and test lipid nanoparticles (LNPs) using high-throughput methods. Your script should precisely instruct the robot on all liquid handling operations required for nanoparticle preparation, including cell experiments.

You will use **pre-defined materials**, but you can select **which formulation variable** you want to test (choose 1). You will make a total of **3 formulations (e.g. Temperature - 25C, 37C , 55C)**.

- Temperature
- pH of the buffer (e.g., citrate buffer pH 5 vs. PBS pH 7.4)
- Mixing speed (no, low or high-speed mixing)
- N to P ratio

Objectives

- Write clear instructions for automated liquid handling systems.
- Define parameters such as volumes, timings, and positions on 96-well plates.
- Incorporate procedures for nanoparticle synthesis, cell treatment, and analysis.

Script Writing Guidelines

- Use your existing scripts to combine them into one whole script that will cover all of the procedures in the following order (use the Group command Groups)

1. Lipid Nanoparticle Synthesis (Ethanol Injection)

2. Nanoparticle Addition in 96-well Plates with Cells

3. DLS - Size and Zeta Sample Preparation

4. Ribogreen Assay