

How to reliably get more data from less volume

The industrialization of biology has become possible thanks to the automation of repetitive tasks – such as liquid handling – making 24/7 operation feasible. This cost-saving automation addresses several major concerns for biology workflows. Firstly, automation brings consistency that reduces the risk of expensive errors that can, for example, delay the publication of your paper in a respected peer-reviewed journal, or hold up the development of a drug. The ability to implement low-error automation may even be critical for regulatory acceptance in clinical applications. Secondly, automation enables personnel to concentrate on key competencies and be more productive.

The industry-wide drive to generate more data has also created a demand for reliable assay miniaturization. Moving manual steps, such as pipetting, onto automated liquid handling solutions enables the reliable dispensing of lower volumes, which can result in both reagent and sample cost savings. This is especially true when increasingly sensitive assays are used to screen libraries of potential drug candidates that are available in very limited amounts.

Dispensing at the lower specified limits of liquid handling platforms – in the microliter or sub-microliter range – can pose particular challenges for the manufacture of low volume disposable tips. This is especially true for highly sensitive techniques, such as next generation sequencing (NGS), where it is advisable to use high quality disposable tips from the manufacturer of the liquid handling instrument, as these issues are addressed during development.

Achieving economy of scale

Massive technological advances have reduced the cost of sequencing the human genome from \$10M to under \$1,000 in less than 10 years, with NGS being the major driver. As a result, the bottlenecks have shifted from sequencing to library preparation. This process can be tedious and error prone when performed manually, as each library must be carefully prepared using time-consuming and resource-intensive processes (see further reading). Automation of library preparation minimizes errors, reduces hands-on time and increases throughput. It can, for example, ramp up the efficiency of NGS for monitoring clinical trials, helping to accelerate clinical development projects.

Success in many NGS protocols relies on accurate and reproducible dispensing of carefully quantified library samples to ensure optimal cluster generation, and also carefully controlled dispensing of small volumes of expensive reagents. Failure can result in time-consuming and expensive resequencing. To meet these needs, automated library preparation is now available to the majority of labs interested in streamlining NGS processes.

More with less - low volume pipette tips for high precision sub-microliter dispensing

Consistently generating more data from lower reaction volumes relies on dispensing small volumes accurately and reproducibly. This is why Tecan has developed a portfolio of new 10 μ l disposable pipette tips that increase the precision of sub-microliter liquid handling. The result is improved success rates in a number of applications, including genomics research, cell-based assays, forensics, molecular diagnostics and microbiology.

The new 10 μ l tips enable you to pipette as little as 0.5 μ l with confidence. This gives an important advantage in applications that require low volume pipetting due to high assay sensitivity, the expense of the reagent or the scarcity of the sample.

An added benefit is that the new 10 μ l tips are longer, enabling you to use a wider range of labware with deeper wells, such as PCR and 384-well plates. The carrier choice is flexible, with a range of formats including standard

trays, ANSI/SLAS format trays and nested trays, which improves throughput and lengthens walkaway times. Tecan's 10 μ l disposable tip can be used with the Liquid Handling Arm™ or Flexible Channel Arm™ of Freedom EVO® and Fluent® liquid handling platforms respectively. The 10 μ l disposable tips are available in non-filtered and filtered formats, and at two purity levels:

- **Tecan Pure** has been developed for genomics research, forensics and molecular diagnostics. These tips are guaranteed to be free from human DNA, PCR inhibitors, RNase and DNase.

- **Tecan Sterile** is intended for cell-based assays and screens, and microbiology applications. These tips are guaranteed to be sterile and free from human DNA, RNase, DNase, pyrogens and endotoxins.

These tips, combined with the precision of automated liquid handling, will provide you with a reliable platform on which to develop robust assay protocols that help you consistently generate more data from lower dispensed volume.

Further reading

Baym M *et al.* Inexpensive multiplexed library preparation for megabase-sized genomes. *PLoS One*, 22 May 2015, **10**(5).

Lamble S *et al.* Improved workflows for high throughput library preparation using the transposome-based Nextera® system. *BMC Biotechnol.* 20 Nov 2013, **13**, 104.