crystallographers' favourite
liquid handlers
The automation of protein crystallography screening has made a significant contribution to the rapid expansion of crystallography-based structural biology. Automated liquid handlers such as mosquito® crystal and mosquito® LCP improve the accuracy, reproducibility and throughput of protein crystallography screens, reducing labour intensive plate preparation for screening, optimisation and scale up as well as eliminating manual pipetting errors. All our mosquito systems offer:

- **Range of low volumes** - robust performance from microlitres to nanolitres
- **Accurate and precise** - using positive-displacement pipetting technology in the 25 nL – 1,200 nL volume range
- **Cost savings** from optimised sample use and reduced waste
- **Zero cross contamination** - using disposable pipette tips
- **Minimal dead volumes** - optimising reagent use
- **More than just dispensing** - our instruments are true pipettors, able to aspirate multiple components, dispense and even mix without splashing or split drops
- **Ease-of-use** - intuitive set-up and software proven in multiple-user labs, just walk up and use it
- **Fast** - no slow wash steps or system fluids

**Protein crystallisation screening**

mosquito® crystal is the protein crystallographer’s favourite liquid handler. It makes protein crystallography screening faster, more cost-effective and quite simply easier than ever before. It brings together speed, accuracy and high precision pipetting of nanolitre volumes with zero cross-contamination from a disposable tip.

- **Flexible automation** - rapid automated plate set-up for all standard crystallisation techniques: sitting drop, hanging drop, microbatch, bicelles, microseeding and additive screening
- **Reproducibility** - unrivalled reproducibility down to 25 nL
- **No configuration changes for different experiments** - eliminates the need for instrument configuration changes when changing techniques or liquid viscosities
- **Multiple aspiration** before a single dispense and microseeding, which is essential for automating additive screening
- **Unrivalled drop precision** - perfectly positioned drops for downstream imaging by placing protein and screen drops with the same head
- **Robust day-to-day performance**, even in heavy use. Proven reliability with no blocking or clogging

**Automating LCP set-up**

mosquito® LCP is the ultimate tool for membrane protein crystallisation with all the functionality of mosquito® crystal. It allows you to fully automate LCP set-ups accurately and repeatedly. mosquito® LCP allows you to dispense lipidic cubic phase (LCP) volumes as low as 25 nL, while automated calibration of syringe and pipette positioning ensures precise drop-on-drop placement to facilitate automated imaging.

- **Automation of membrane protein crystallisation screening**, optimisation and scale-up using techniques such as LCP and bicelles
- **Versatility** - ability to set up both LCP and all traditional protein crystallisation experiments with just one instrument using commercially available SBS-format plates
- **Flexibility of sample type** - precise pipetting across a wide range of liquid viscosities with no format change required
- **Speed of set up** - rapid tip changing and no washing
- **Active humidity control** - mosquito’s active humidity chamber reduces experimental inconsistencies caused by variation in the humidity in the environment
screen optimisation optimised
dragonfly® crystal enhances protein crystal screen optimisation,
dragonfly® crystal is the ideal system to complement TTP
Labtech’s mosquito® in the protein crystallisation workflow. Once
the initial crystal ‘hits’ are identified, dragonfly crystal produces a
set of optimised conditions to grow better diffracting crystals.
- no liquid classification - making set-up quick and easy
- flexible automation - dispense any volume from 0.5 μL
  upwards to 4 mL, into any well, from any syringe. Independent
  control of each channel
- fast - rapid completion of plate irrespective of viscosity
  variation in stocks (5-8 mins)
- negligible evaporation of the dispensed reagents due to
  minimal set-up time
- stock integrity - positive displacement technology
  preserves stock integrity, even for volatiles
- free unlimited screen designer software - interactive,
  highly intuitive, powerful and simple set-up on multiple
  instruments anywhere, anytime

active humidity
chamber
mosquito’s active humidity
chamber reduces
experimental inconsistencies
caused by variation in the
humidity in the environment,
by allowing users to accurately
control the relative humidity
(RH) of each experiment.
- enables up to a 90% reduction in drop
  evaporation
- it takes only a few minutes to reach high levels of
  humidity (80-90% RH)
- precisely controlled from
  within mosquito software
  (version permitting)
- allows ‘per protocol’
  control to suit multi-user
  labs

MXone in-well mixer
MXone is the perfect
companion to dragonfly
crystal to mix any liquid in
small wells. The MXone
keeps the plate stationary,
allowing for extremely fast
mixing of even the most
viscous solutions with no risk
of spillage using high-speed
oscillation of a disposable pin.
- fast and efficient
- zero cross-contamination
- range of viscosities mixed
  in one plate
- avoids spillage as seen with
  orbital shakers

LCP mixer
The LCP mixer has been
designed to automatically mix
protein and monooelin (MO),
or other lipids, into a lipidic
 cubic phase (LCP) from two
coupled syringes.
- accepts any combination
  of 100 μL and 50 μL
  Hamilton syringes
- accepts any sample
  volume
- simple and robust design
- glove friendly touch screen
  display
- on-the-fly adjustment of
  mix cycles
- compact unit to save
  bench space
- no adjustment or
  calibration required

essentials for innovative technology

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As a protein crystallographer you want to be safe in the knowledge that the wide range of viscosities regularly encountered is handled and dispensed accurately and repeatably every time without liquid classification.

The difficulties of pipetting accurately at low volumes are well known, as are issues associated with handling viscous liquids. Our innovative technology development team have overcome these with the novel use of positive displacement dispensing from disposable tips in all of our liquid handling products. Positive displacement pipetting is defined by the fact that the piston moving the liquid in and out of the tip for aspiration and dispensing comes into direct contact with the liquid that is being moved. This piston based pipetting action results in highly accurate liquid handling across a very broad volume and viscosity range.

dragonfly uses much larger (4 mL) positive displacement, disposable tips to aspirate from reservoirs and dispense non-contact to wells within plates. It is therefore ideal for combination and bulk reagent dispensing as well as accurate handling of difficult liquid classes.

mosquito uses positive displacement, disposable micropipettes to handle low volumes (25 nL - 5 uL) of liquid in plate to plate, or intra plate, transfers using contact dispensing - thus it’s ideal for traditional pipetting tasks that users would like to miniaturise.

true positive displacement pipetting of an optimisation gradient with dragonfly - how it works

simple
- Intuitive and logical operation simplifies user experience and reduces set up time and training requirements

productive
- No air gaps or system liquids mean accurate displacement of liquids, irrespective of liquid class

versatile
- More than just dispensing - our instruments are true pipettors, able to aspirate, dispense and even mix

economical
- Direct sample aspiration by the tip ensures minimal sample dead volumes

reliable
- Disposable tips and a piston based pipetting mechanism with no pressure system or valves results in robust and reliable performance

innovative
- Motor driven pistons reliably eject liquid from the tips directly, providing extremely repeatable dispensing

the accurate way to handle liquids
### specifications

<table>
<thead>
<tr>
<th></th>
<th>mosquito® crystal</th>
<th>mosquito® LCP</th>
<th>dragonfly® crystal</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>pipetting range</strong></td>
<td>25 nL – 1.2 μL</td>
<td>25 nL – 1.2 μL</td>
<td>0.5 μL – 4 mL</td>
</tr>
<tr>
<td><strong>applications</strong></td>
<td>protein crystallography set-ups e.g. additive screening, microseeding, microbatch, bicelles</td>
<td>lipidic cubic phase (LCP) screening plus all the functionality of mosquito crystal</td>
<td>protein crystal optimisation and assay development without contamination or liquid classification</td>
</tr>
<tr>
<td><strong>primary SBS plate format</strong></td>
<td>48, 96, 384</td>
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<td>15, 24, 48, 96, (384)</td>
</tr>
<tr>
<td><strong>dead volume</strong></td>
<td>&lt; 0.3 μL</td>
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<td>&lt; 0.5 mL</td>
</tr>
<tr>
<td><strong>optional extras</strong></td>
<td>active humidity chamber</td>
<td>active humidity chamber, LCP mixer</td>
<td>MXone automated in-well mixer</td>
</tr>
<tr>
<td><strong>throughput</strong></td>
<td>&lt; 2 mins/ 96-well plate, 4 mins/ 288 drops</td>
<td>2 mins/ 96 drop plate for vapour diffusion 5 mins/ 96 drop LCP plate</td>
<td>4–6 ingredient, 96-well plate in 4–8 mins, irrespective of viscosity</td>
</tr>
</tbody>
</table>

### get in touch

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