Application Note

INTEGRA

Automated reagent and sample aliquoting with the ASSIST PLUS pipetting robot

Introduction

Aliquoting is a routine pipetting procedure that refers to the transfer of one or multiple portion(s) of a liquid to a different vessel. It is a useful technique to create space-saving back-up plates of primary tubes, or to split expensive reagents into smaller volumes to increase overall open vial stability. When done manually, aliquoting can be time consuming and error prone. Combining the ASSIST PLUS pipetting robot with the VOYAGER adjustable tip spacing pipette or D-ONE single channel pipetting module provides unique solutions for the user. With the VOYAGER, the pipetting robot offers adjustable tip spacing when aliquoting between different types of labware, while the D-ONE pipetting module guarantees precise aliquoting from a single tube.

Key benefits:

- The ASSIST PLUS pipetting robot ensures accurate sample transfers to help prevent human errors.
- Using the VOYAGER adjustable tip spacing pipette to aliquot samples between different labware formats in high throughput makes the process simple and easy.
- Reagent aliquoting from tubes provided in a kit saves money and time when using the D-ONE single channel pipetting module.
- The operator gains more walk-away time and is protected from exposure to harmful substances by using the ASSIST PLUS pipetting robot.

Overview: How to aliquot reagents and samples faster

In this application note, we show six examples of reagent and sample aliquoting into different labware types (**Figure 1** shows single and multiple aliquoting):

1. Sample (from swab tubes) aliquoting for space-saving, long-term storage
2. Aliquoting of compounds dissolved in DMSO for cryogenic storage
3. Purified nucleic acid aliquoting from deep well extraction plate
4. Sample (bronchial lavage, urine, etc.) splitting for biobanking
5. Reagent (primers, probes, etc.) splitting to increase overall open vial stability
6. Aliquoting reagents (buffers, master mixes, etc.) for kit preparation

ASSIST PLUS

Experimental set-up:

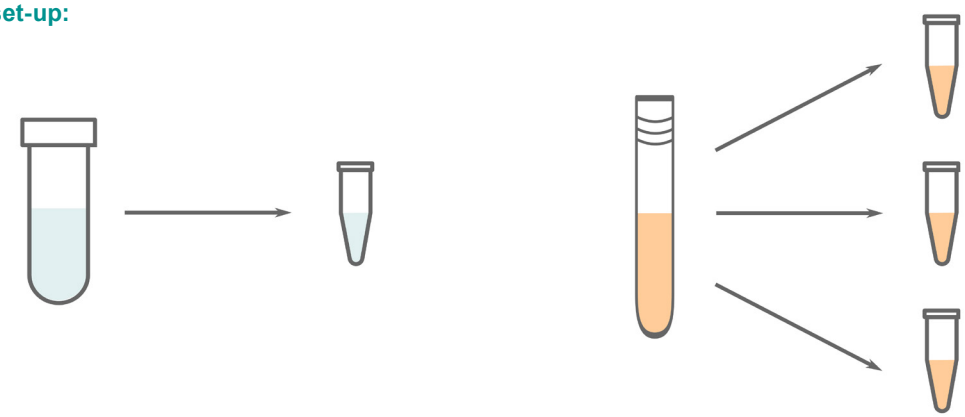

Figure 1: Illustration of a single aliquoting versus a multiple aliquoting procedure.

1. Sample (from swab tubes) aliquoting for space-saving, long-term storage

STEP: Aliquoting from swab tubes to a 96 deep well plate.

HOW TO: Place an INTEGRA rack for swab tubes with patient samples on deck position B (**Figure 2**, blue) and a 96 deep well plate on deck position C (**Figure 2**, magenta).

Run the VIALAB program 'Aliquoting_from_swab_tubes'. The 6 channel 1250 µl VOYAGER adjustable tip spacing pipette with 1250 µl Sterile, Filter, Wide Bore GRIPTIPS aspirates 1000 µl of each sample from the swab tubes (**Figure 3a**) and dispenses them to the 96 deep well plate (**Figure 3b**), automatically changing the tips between different samples. After filling up the first half of the 96 deep well plate, the pipette prompts the user to exchange the INTEGRA rack for swab tubes on deck position B (**Figure 2**, blue). After loading the next 48 swab tubes, the VOYAGER continues to fill up the second half of the 96 deep well plate.

Tips:

- A 50 µl air gap at the end of every aspiration step minimizes the risk of cross-contamination.
- Wide bore tips and slower aspiration/dispense speeds can be used when samples tend to be more viscous.

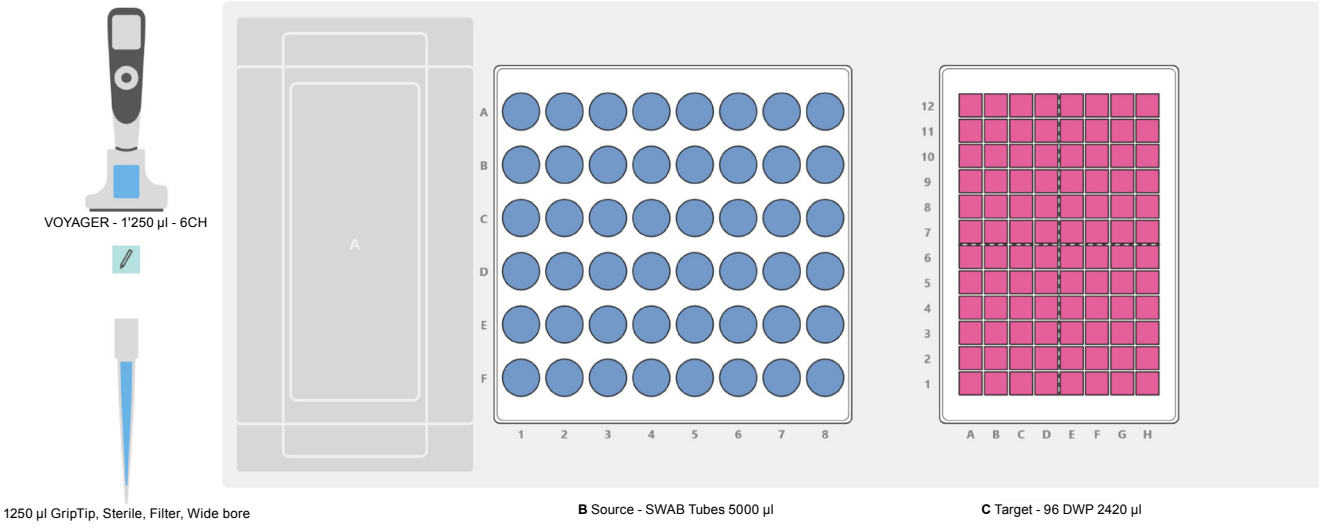

Figure 2: Deck set-up for sample transfer from swab tubes to 96 deep well plate. **Position A**: Empty. **Position B**: INTEGRA rack for swab tubes (blue). **Position C**: 96 deep well plate (magenta).

a)

b)

Figure 3: Sample transfer from a) swab tubes to b) 96 deep well plate with VOYAGER pipette.

2. Aliquoting of compounds dissolved in DMSO for cryogenic storage

STEP: Aliquoting from a flat bottom 96 well plate to cryogenic vials.

HOW TO: Place a flat bottom 96 well plate with samples on deck position B (**Figure 4**, blue) and an INTEGRA rack for cryogenic tubes on deck position C (**Figure 4**, magenta).

Run the VIALAB program 'Aliquoting_from_f-bottom_plate'. The 8 channel 300 µl VOYAGER pipette with 300 µl Sterile, Filter, Low Retention GRIPTIPS aspirates 200 µl of each sample from the flat bottom 96 well plate and dispenses them to 1.5 ml cryogenic vials. Tips are changed automatically between samples. The pipette will inform the user to change the INTEGRA rack for cryogenic vials on deck position C (**Figure 4**, magenta) when the first half of the 96 well plate has been aliquoted.

Tips:

- Setting an aspiration/dispense delay ensures that viscous liquid enter and exit the GRIPTIPS properly.
- Low Retention GRIPTIPS and slower dispense speeds can be used to ensure the full volume of liquid is expelled.

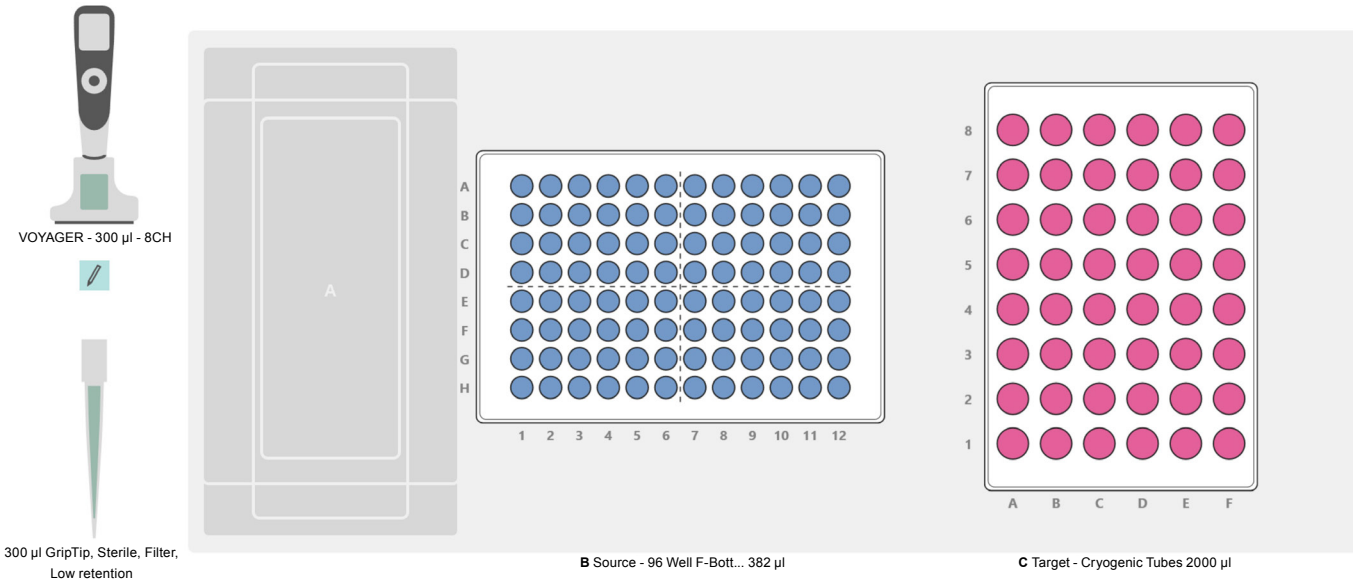

Figure 4: Set-up for sample transfer from flat bottom 96 well plate. **Position A**: Empty. **Position B**: flat-bottom 96 well plate (blue). **Position C**: INTEGRA rack for cryogenic tubes (magenta).

3. Purified nucleic acid aliquoting from deep well extraction plates

STEP: Aliquoting from deep well extraction plate to 1.5 ml microcentrifuge tubes.

HOW TO: Place a deep well extraction plate on deck position B (**Figure 5**, blue) and an INTEGRA rack for 1.5 ml microcentrifuge tubes on deck position C (**Figure 5**, magenta).

Run the VIALAB program 'Aliquoting_from_extraction_DWP'. The 8 channel 125 µl VOYAGER pipette with 125 µl Sterile, Filter GRIPTIPS aspirates 50 µl of each sample from the elution plate and dispenses them into 1.5 ml microcentrifuge tubes. Tips are changed automatically between samples. After half of the samples have been transferred, the pipette will inform the user to load a new INTEGRA rack with empty 1.5 ml microcentrifuge tubes on deck position C (**Figure 6**, magenta) and continue aliquoting.

Tip:

- The procedure parameters can be easily modified in the VIALAB software. If the volume of the purified nucleic acid is different, this can be adjusted rapidly.

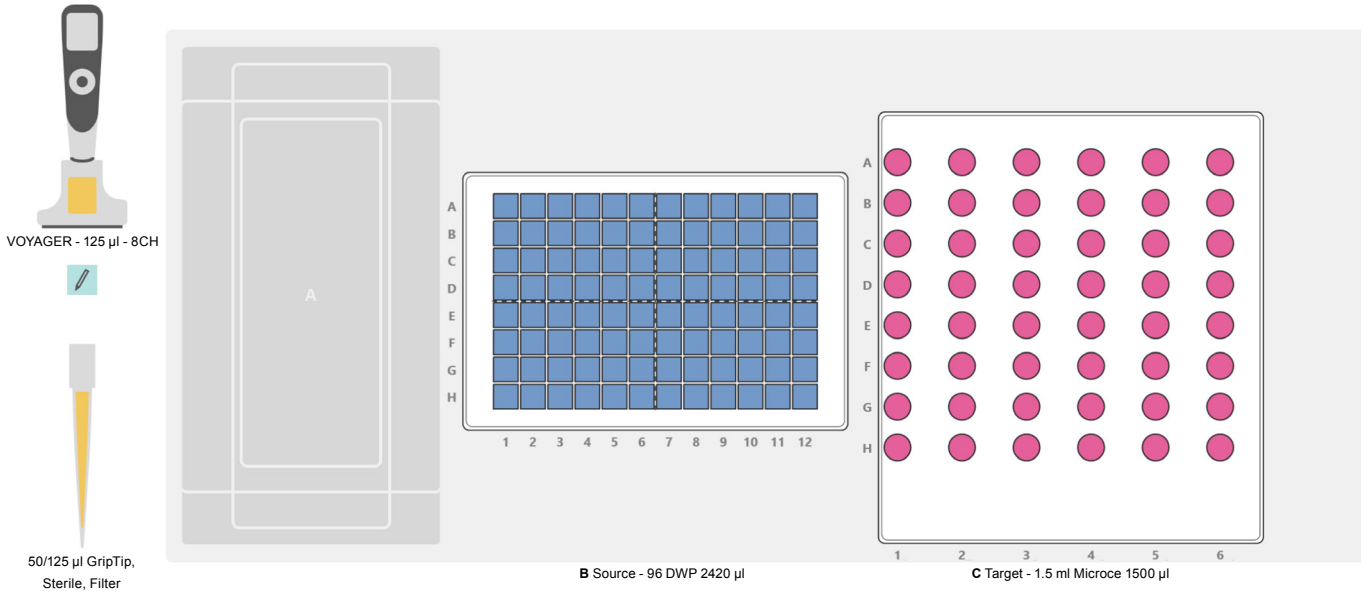

Figure 5: Deck set-up for purified nucleic acid transfer from deep well extraction plates. **Position A**: Empty. **Position B**: Deep well extraction plate (blue). **Position C**: INTEGRA rack for 1.5 ml microcentrifuge tubes (magenta).

4. Sample (bronchial lavage, urine, etc.) splitting for biobanking

STEP: Multiple sample aliquoting from centrifuge tubes to FluidX™ tubes.

HOW TO: Place an INTEGRA rack for centrifuge tubes with patient samples on deck position A (**Figure 6**, blue), and a FluidX 96-format tubes on positions B and C (**Figure 6**, magenta).

Run the VIALAB program 'Aliquoting_from_centrifuge_tube'. The 6 channel 1250 µl VOYAGER pipette with 1250 µl Sterile, Filter GRIPTIPS aspirates the samples from the centrifuge tubes, and dispenses 250 µl of each sample to FluidX tubes until every sample contains eight 250 µl aliquots, with automatic changing of tips between different samples.

Tip:

- The repeat dispense function of an electronic pipette speeds up this process, making it four times faster than using a mechanical multichannel pipette.

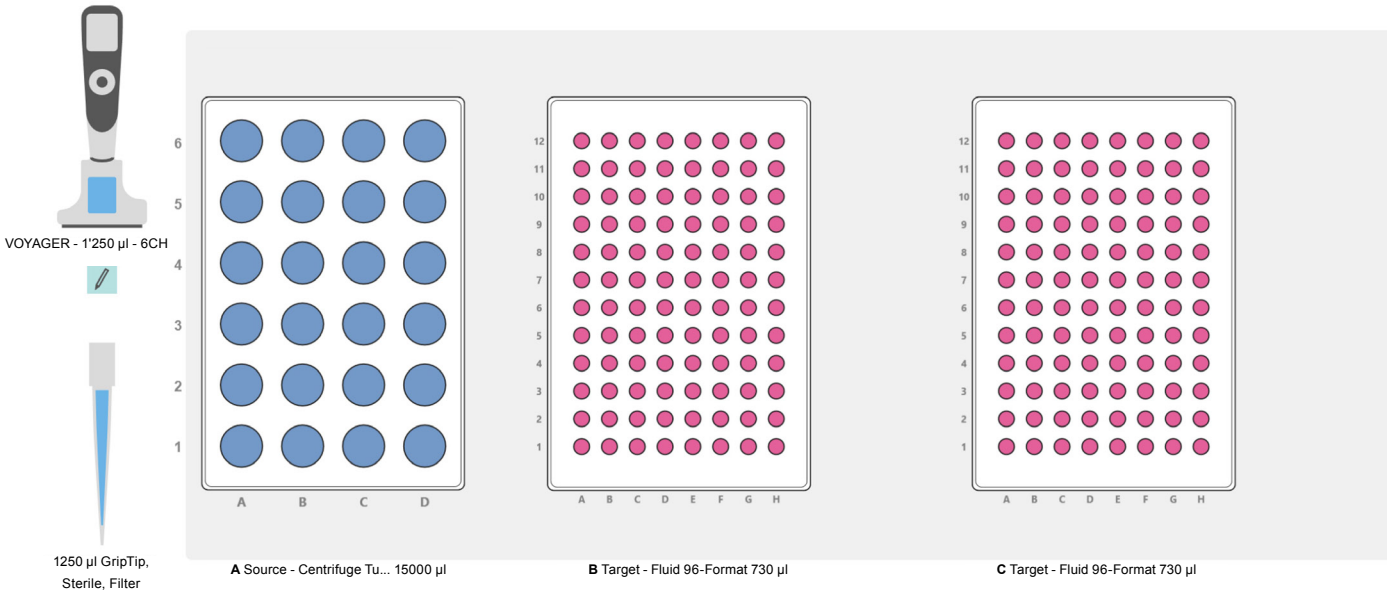

Figure 6: Deck set-up for sample aliquoting from centrifuge tubes to FluidX™ tubes. **Position A**: INTEGRA rack for centrifuge tubes. **Position B**: FluidX 96-format tubes (magenta). **Position C**: FluidX 96-format tubes (magenta).

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5. Reagent (primers, probes, etc.) splitting to increase overall open vial stability

STEP: Multiple aliquoting from a 2 ml manufacturer's tube to 0.5 ml microcentrifuge tubes.

HOW TO: Place an INTEGRA rack for 2 ml tubes with the manufacturer's tube on position A1 on deck position B (**Figure 7**, blue) and an INTEGRA rack for 0.5 ml centrifuge tubes on deck position C (**Figure 7**, magenta).

Run the VIALAB program 'Aliquoting_from_manufacturer_tube'. The 5-1250 µl D-ONE pipetting module with 1250 µl Sterile, Filter GRIPTIPS aspirates the reagent from the manufacturer's tube and dispenses 50 µl into every 0.5 ml microcentrifuge tube (**Figure 8**).

Tip:

- This protocol is optimized for speed. If the reagent needs to be aliquoted at high precision, the tip type can be switched to the 125 µl GRIPTIPS in VIALAB, and the system will automatically adjust the volume that needs to be aspirated.

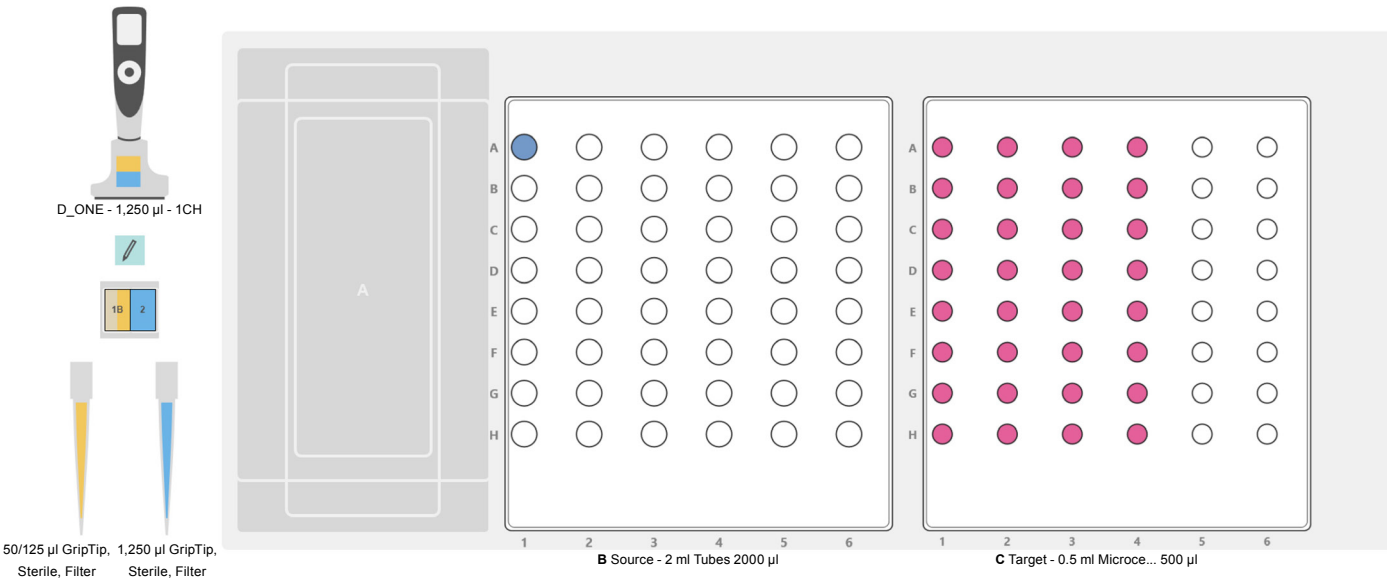

Figure 7: Set-up for reagent transfer from manufacturer's tubes to microcentrifuge tubes. **Position A**: Empty. **Position B**: INTEGRA rack for 2 ml tubes. **Position C**: INTEGRA rack for 0.5 ml microcentrifuge tubes.

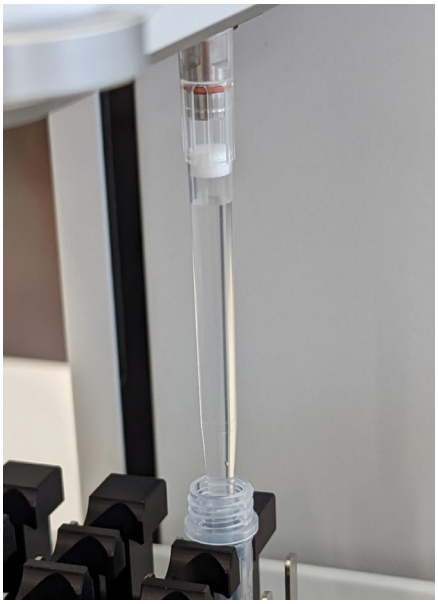

Figure 8: Reagent aliquoting from a manufacturer tube with the D-ONE pipetting module.

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6. Aliquoting reagents (buffers, master mixes, etc.) for kit preparation

STEP: Multiple aliquoting from 100 ml INTEGRA reservoir to 2 ml tubes.

HOW TO: Place a 100 ml INTEGRA reservoir on deck position A (**Figure 9**, blue), and INTEGRA racks for 2 ml tubes with screw caps on deck positions B and C (**Figure 9**, magenta).

Run the VIALAB program 'Aliquoting_from_reservoir'. The 8 channel 1250 µl VOYAGER pipette with 1250 µl Sterile, Filter GRIPTIPS aspirates the reagent from the reservoir, and dispenses 1000 µl into each 2 ml tube.

Tip:

- If the aliquoting volume needs to be smaller than 500 µl, the dispense type can be switched in VIALAB, speeding up the process.

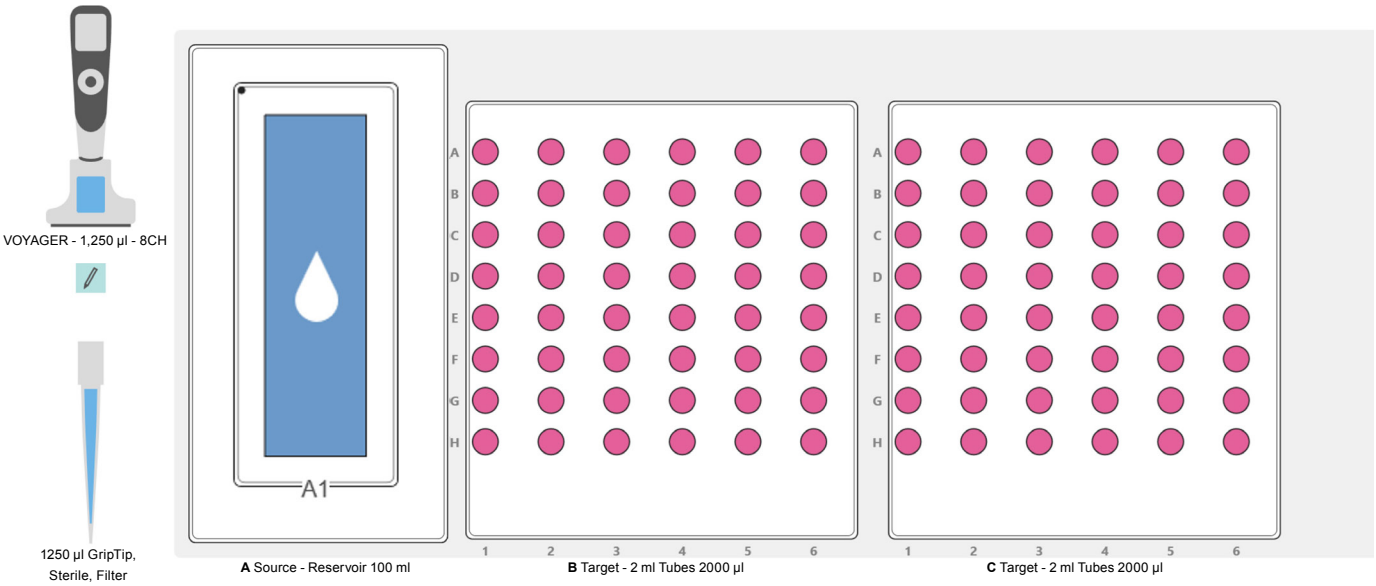

Figure 9: Deck set-up for reagent aliquoting from an INTEGRA reservoir to tubes. **Position A**: INTEGRA 100 ml reservoir. **Position B**: INTEGRA rack for 2 ml centrifuge tubes (magenta). **Position C**: INTEGRA rack for 2 ml centrifuge tubes (magenta).

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Remarks

- **VIALAB software:** The VIALAB software gives the option to change protocols and labware according to workflow needs, adapting easily to future requirements.
- **Partial plates:** Programs can be adapted to accommodate a different number of samples at any time.

Conclusion

- The ASSIST PLUS pipetting robot equipped with the VOYAGER adjustable tip spacing pipette is the perfect solution to transfer samples and reagents between different labware formats using single or multi-dispensing.
- The D-ONE pipetting module enables fast and easy multiple aliquoting from a single manufacturer's tube to any other labware type.
- The automated protocols provided offer simple, fast, and ready-to-use solutions for six common aliquoting procedures with maximum walk-away time.
- Thanks to its compact footprint, the ASSIST PLUS can be placed in a laminar flow hood whenever sterile conditions are required during aliquoting.
- The ASSIST PLUS is an indispensable tool to increase overall throughout in sample and reagent processing.

Materials

Manufacturer	Part Number	Description	Link
INTEGRA	4505	ASSIST PLUS base unit	https://www.integra-biosciences.com/global/en/pipetting-robots/assist-plus
INTEGRA	4532	D-ONE pipetting module	https://www.integra-biosciences.com/global/en/pipetting-robots/d-one-for-assist-plus
INTEGRA	4722	VOYAGER 8 channel 125 µl electronic pipette	https://www.integra-biosciences.com/global/en/electronic-pipettes/voyager
INTEGRA	4723	VOYAGER 8 channel 300 µl electronic pipette	https://www.integra-biosciences.com/global/en/electronic-pipettes/voyager
INTEGRA	4764	VOYAGER 6 channel 1250 µl electronic pipette	https://www.integra-biosciences.com/global/en/electronic-pipettes/voyager
INTEGRA	4724	VOYAGER 8 channel 1250 µl electronic pipette	https://www.integra-biosciences.com/global/en/electronic-pipettes/voyager
INTEGRA	4535	D-ONE Tip Deck	https://www.integra-biosciences.com/global/en/pipetting-robots/d-one-for-assist-plus
INTEGRA	4540	Rack for 1.5/2 ml microcentrifuge tubes	https://www.integra-biosciences.com/global/en/pipetting-robots/assist-plus
INTEGRA	4541	Rack for 0.5 ml microcentrifuge tubes	https://www.integra-biosciences.com/global/en/pipetting-robots/assist-plus
INTEGRA	4542	Rack for 15 ml centrifuge tubes	https://www.integra-biosciences.com/global/en/pipetting-robots/assist-plus
INTEGRA	4544	Rack for cryogenic tubes	https://www.integra-biosciences.com/global/en/pipetting-robots/assist-plus
INTEGRA	4546	Rack for swab tubes	https://www.integra-biosciences.com/global/en/pipetting-robots/assist-plus

Materials

Manufacturer	Part Number	Description	Link
INTEGRA	6465	125 µl Sterile, Filter Grip Tips	https://www.integra-biosciences.com/global/en/pipette-tips/griptip-selector-guide
INTEGRA	6535	300 µl Sterile, Filter, Low Retention Grip Tips	https://www.integra-biosciences.com/global/en/pipette-tips/griptip-selector-guide
INTEGRA	6445	1250 µl Sterile, Filter Grip Tips	https://www.integra-biosciences.com/global/en/pipette-tips/griptip-selector-guide
INTEGRA	6645	1250 µl Sterile, Filter Wide Bore Grip Tips	https://www.integra-biosciences.com/global/en/pipette-tips/griptip-selector-guide
INTEGRA	4305	100 ml Reservoir Base	https://www.integra-biosciences.com/global/en/reagent-reservoirs/multichannel-reagent-reservoirs
INTEGRA	4321	100 ml Reservoir	https://www.integra-biosciences.com/global/en/reagent-reservoirs/multichannel-reagent-reservoirs
Copan	490CE.A	Swab tubes, autom. LQ Amies reg. nylon flocked applicator	https://www.copangroup.com/product-ranges/eswab/
Greiner Bio-One International	780270	Masterblock, 96 well, 2 ml, V-bottom	https://shop.gbo.com/en/switzerland/products/bioscience/microplates/polypropylene-storage-plates/96-well-masterblock-2ml/780270.html
Greiner Bio-One International	126280	CRYO.S, 2 ml	https://shop.gbo.com/en/switzerland/products/bioscience/cryos-and-biobanking-tubes/cryos/cryos-2ml-external-thread/126280.html?_ga=2.99187354.541342374.1620396370-2015615799.1617975330
Greiner Bio-One International	655161	96 Well Microplate, PS, F-Bottom	https://shop.gbo.com/en/germany/products/bioscience/microplates/96-well-microplates/96-well-microplates-clear/655161.html?_ga=2.194844971.761907635.1609937175-74237308.1609937175
Greiner Bio-One International	616201	Reaction Tube, 1.5 ml, PP, Natural, Attached Cap	https://shop.gbo.com/en/switzerland/products/bioscience/reaction-tubes-analyser-cups/bs-reaction-tubes/616201
Greiner Bio-One International	667201	Reaction Tube, 0.5 ml, with Attached Cap	https://shop.gbo.com/en/germany/products/bioscience/microplates/96-well-microplates/96-well-microplates-clear/655161.html?_ga=2.194844971.761907635.1609937175-74237308.1609937175
VWR International	525-1084	Centrifuge tubes, Ultra-High Performance, Sterile, PP	https://ch.vwr.com/store/product/en/26825109/centrifuge-tubes-ultra-high-performance-vwr
AZENTA Life Sciences	66-62318-Y6	0.7ml Dual-coded Tube, 96-format, Internal Thread	https://www.azenta.com/products/0.7ml-dual-coded-tube-96-format-internal-thread

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