

# Fast and efficient automated sample transfer from tubes to plates with the ASSIST PLUS pipetting robot

## Introduction

When processing samples in tubes, transfers are often performed manually with a single channel pipette. This is time consuming, error prone and draining for the operator. The ASSIST PLUS pipetting robot – in combination with a VOYAGER adjustable tip spacing pipette – provides a novel solution for accurate and efficient transfer of liquids to and

from a variety of tube types. This unique pipetting robot provides all the benefits of the VOYAGER's adjustable tip spacing – reformatting samples from tube to plate up to 12 times faster compared to using a single channel pipette – as part of a walk-away, automated protocol.

### Key benefits:

- When using the ASSIST PLUS, the right sample is always transferred to the right well, eliminating the chance of human errors.
- INTEGRA's extensive range of tube racks, with the option to place labware in either landscape and portrait orientations, ensures the highest degree of versatility for sample transfers.
- Automated transfer of hazardous samples using the ASSIST PLUS protects operators from potential exposure to harmful substances, while extending walk-away times.
- The VOYAGER adjustable tip spacing pipette can be equipped with 300 µl LONG GripTips to avoid the risk of cross contamination by touching the wall of long tubes.

## Overview: How to transfer samples from tubes faster

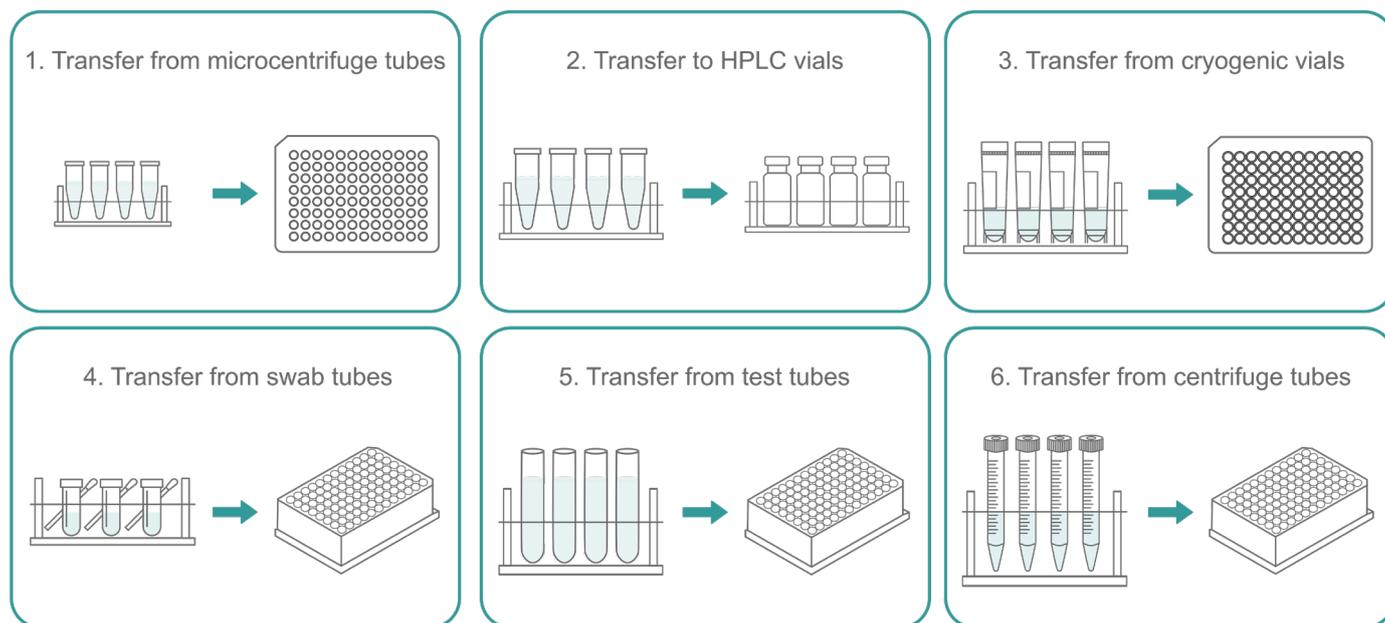
### Overview of steps:

In this application note, we show six examples of different sample transfers from either tubes to a plate, or from tubes to tubes (See **Figure 1**):

- Step 1:** Transfer from 0.5 ml microcentrifuge tubes to a 96 well plate.
- Step 2:** Transfer from 1.5 ml microcentrifuge tubes to HPLC vials.
- Step 3:** Transfer from cryogenic vials to a 96 flat bottom plate.
- Step 4:** Transfer from swab tubes to 96 deep well plate.
- Step 5:** Transfer from test tubes to 96 deep well plate.
- Step 6:** Transfer from 15 ml centrifuge tubes to 96 deep well plate.

### ASSIST PLUS





**Figure 1:** Six example sample transfer procedures.

### 1. Transfer from microcentrifuge tubes

**STEP:** Sample transfer for qPCR analysis from 0.5 ml microcentrifuge tubes to a 96 well PCR plate placed on a cooling block

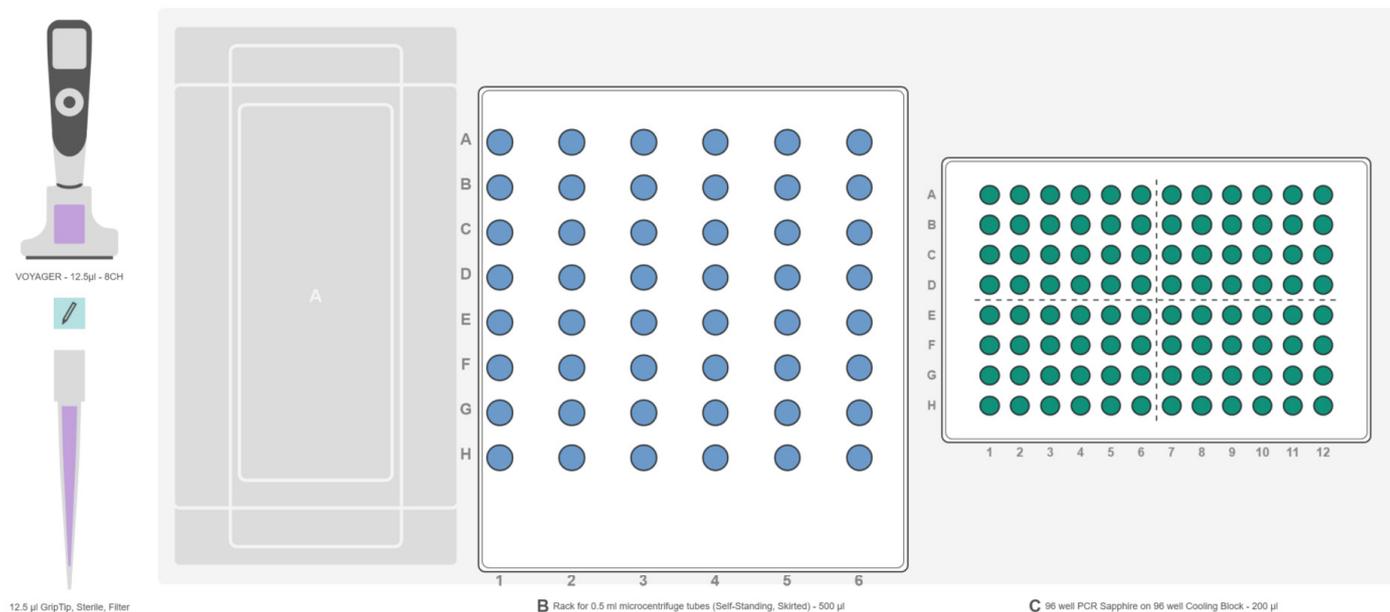
**HOW TO:** Place the INTEGRA rack for 0.5 ml microcentrifuge tubes on deck position B, and load with microcentrifuge tubes containing the samples for qPCR (**Figure 2**, blue). Next, place the INTEGRA cooling block on **position C**, and place a 96 well PCR plate with the qPCR master mixes onto the cooling block (**Figure 2**, green).

Select and run the VIALAB program 'Transfer\_from\_microcentrifuge\_tubes' using an 8 channel 12.5 µl VOYAGER pipette equipped with 12.5 µl Sterile Filter GripTips. The pipette transfers eight 2.5 µl samples to the PCR plate in parallel. A 0.5 µl pre- and post-dispense ensures precision while pipetting, and the tips are automatically changed after each dispense to avoid cross contamination.

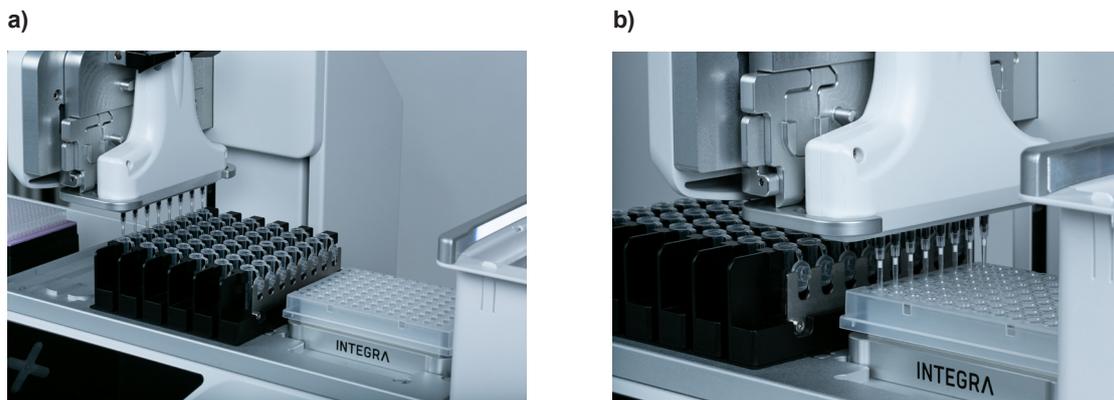
After completing the sixth dispense step, the ASSIST PLUS informs the operator to change the sample rack. With six further aspirations and dispenses, sample transfer into the 96 well PCR plate is complete.

**Tip:**

- The procedure parameters are easily modified in the VIALAB software as required. If the sample volume for qPCR is different, this can also be set up rapidly with ease.



**Figure 2:** Deck set-up for sample transfer from 0.5 ml microcentrifuge tubes to a 96 well PCR plate placed on a cooling block. **Position A:** Empty. **Position B:** INTEGRA rack for 0.5 ml microcentrifuge tubes (blue). **Position C:** 96 well PCR plate placed on INTEGRA cooling block (green).



**Figure 3:** Sample transfer from a) 0.5 ml microcentrifuge tubes to b) a 96 well PCR plate.

## 2. Transfer to HPLC vials

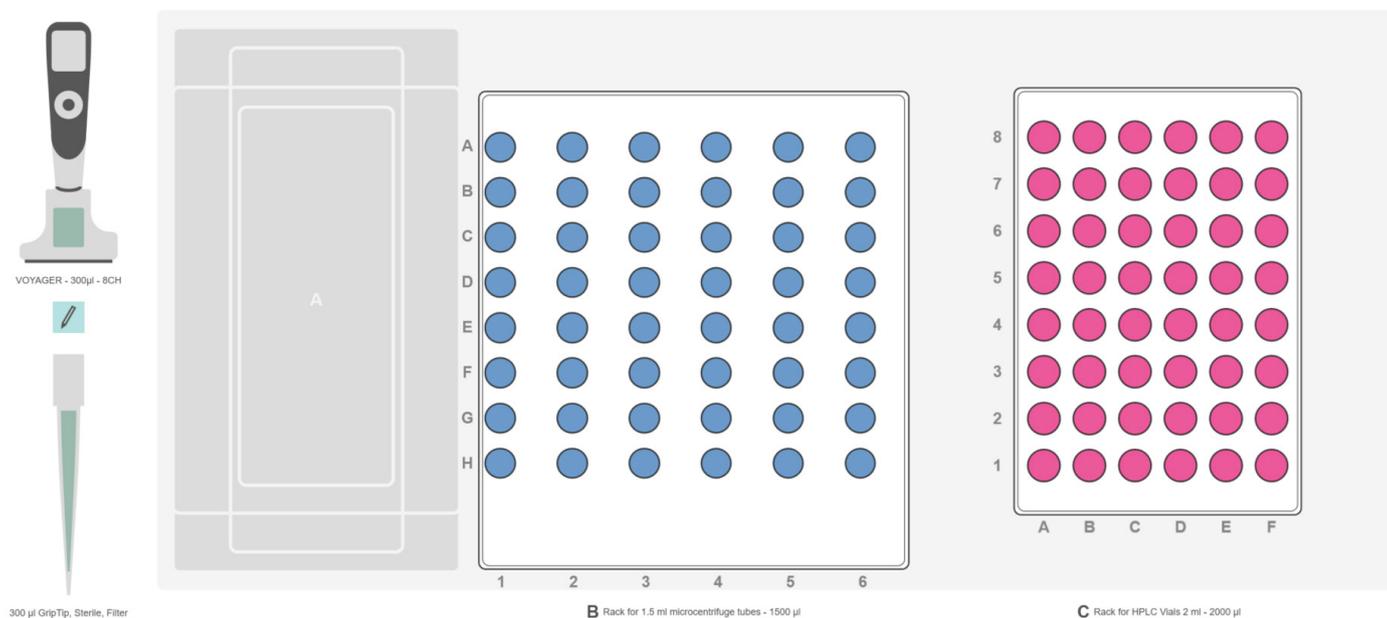
**STEP:** Sample transfer from 1.5 ml microcentrifuge tubes to HPLC vials

**HOW TO:** Place the INTEGRA rack for 1.5/2 ml microcentrifuge tubes on deck **position B**, then fill with sample tubes (**Figure 4**, blue). Next, place the INTEGRA rack for HPLC tubes on deck **position C** (**Figure 4**, magenta).

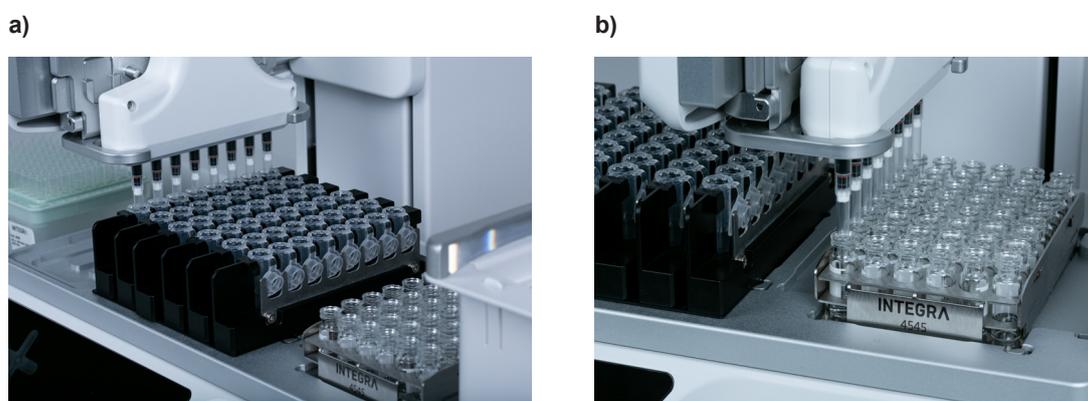
Select the VIALAB program 'Transfer\_to\_HPLC\_vials' and press Run. Using an 8 channel 300 µl VOYAGER pipette with 300 µl Sterile Filter GripTips, the system transfers 200 µl samples from the microcentrifuge tubes to the HPLC tubes for analysis. A 15 µl pre- and post-dispense step is used to increase the accuracy and precision of pipetting.

**Tip:**

- The pre- and post-dispense volume should be 3-5 % of the nominal pipette tip volume.



**Figure 4:** Set-up for sample transfer from 1.5 ml microcentrifuge tubes to HPLC vials. **Position A:** Empty. **Position B:** INTEGRA rack for 1.5/2 ml microcentrifuge tubes (blue). **Position C:** INTEGRA rack for HPLC tubes (magenta).



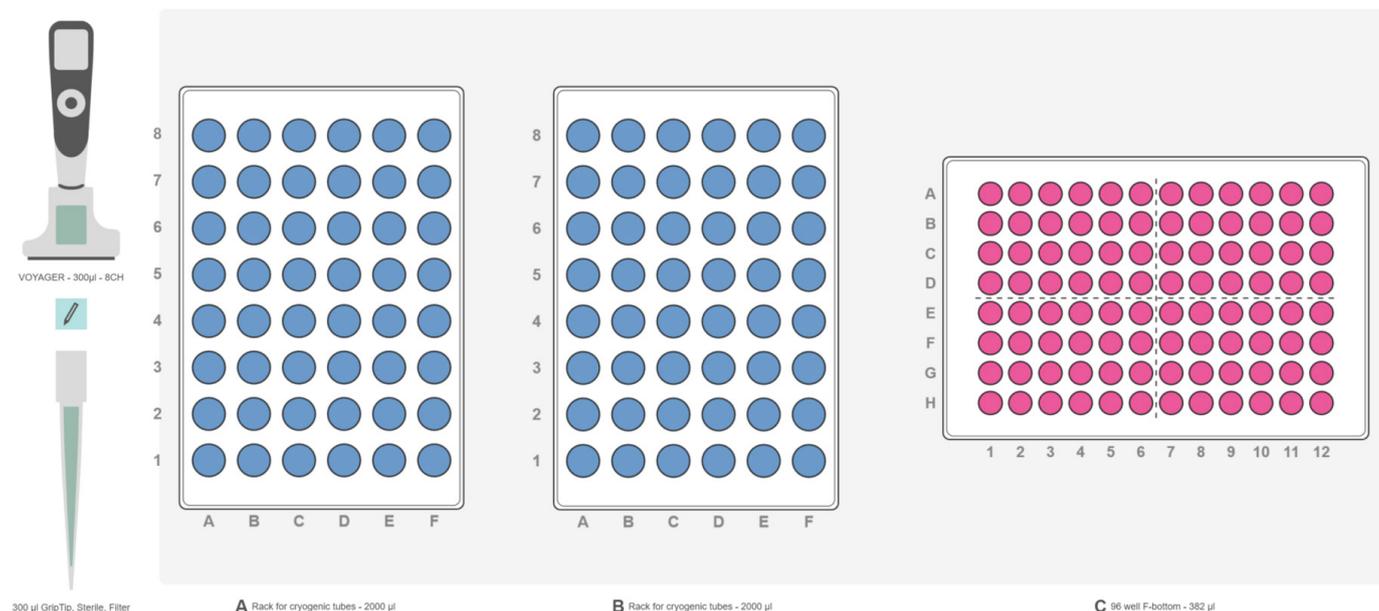
**Figure 5:** Sample transfer from **a)** 1.5 ml microcentrifuge tubes to **b)** HPLC tubes with a VOYAGER pipette.

### 3. Transfer from cryogenic vials

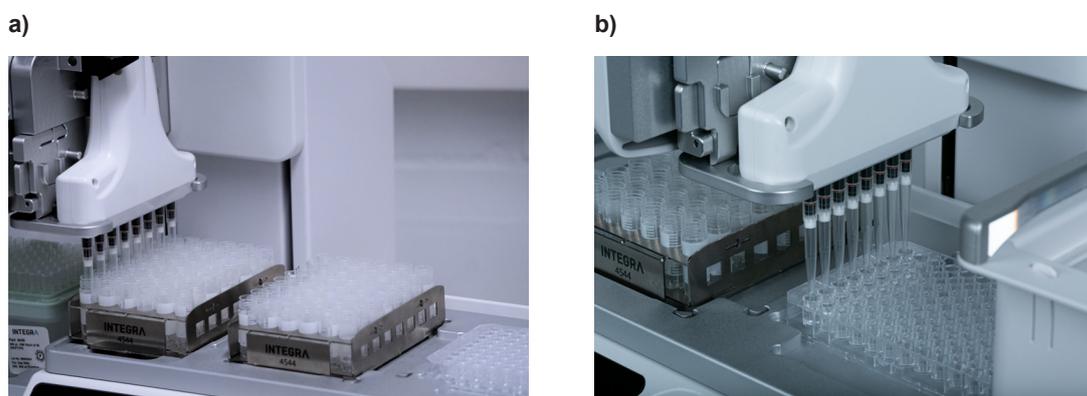
**STEP:** Sample transfer from cryogenic vials to a 96 well flat bottom plate

**HOW TO:** Place INTEGRA cryogenic vial racks containing the samples to be transferred for analysis on deck **positions A and B** (Figure 5, blue), then set a 96 well flat bottom plate on **position C** (Figure 5, magenta).

Select and run the VIALAB program 'Transfer from cryogenic vials' on the pipette. An 8 channel 300 µl VOYAGER pipette fitted with 300 µl Sterile Filter GripTips then transfers 200 µl samples from cryogenic tubes to 96 well flat bottom plate, changing the tips after each transfer. A 15 µl pre- and post-dispense step is included to increase the accuracy and precision of pipetting.



**Figure 6:** Example set-up for sample transfer from 96 cryogenic vials to a 96 well flat bottom plate. **Position A:** INTEGRA rack for cryogenic tubes (blue). **Position B:** INTEGRA rack for cryogenic tubes (blue). **Position C:** 96 well flat bottom plate (magenta).



**Figure 7:** Sample transfer from a) cryogenic tubes to b) a 96 well flat bottom plate with a VOYAGER pipette.

## 4. Transfer from swab tubes

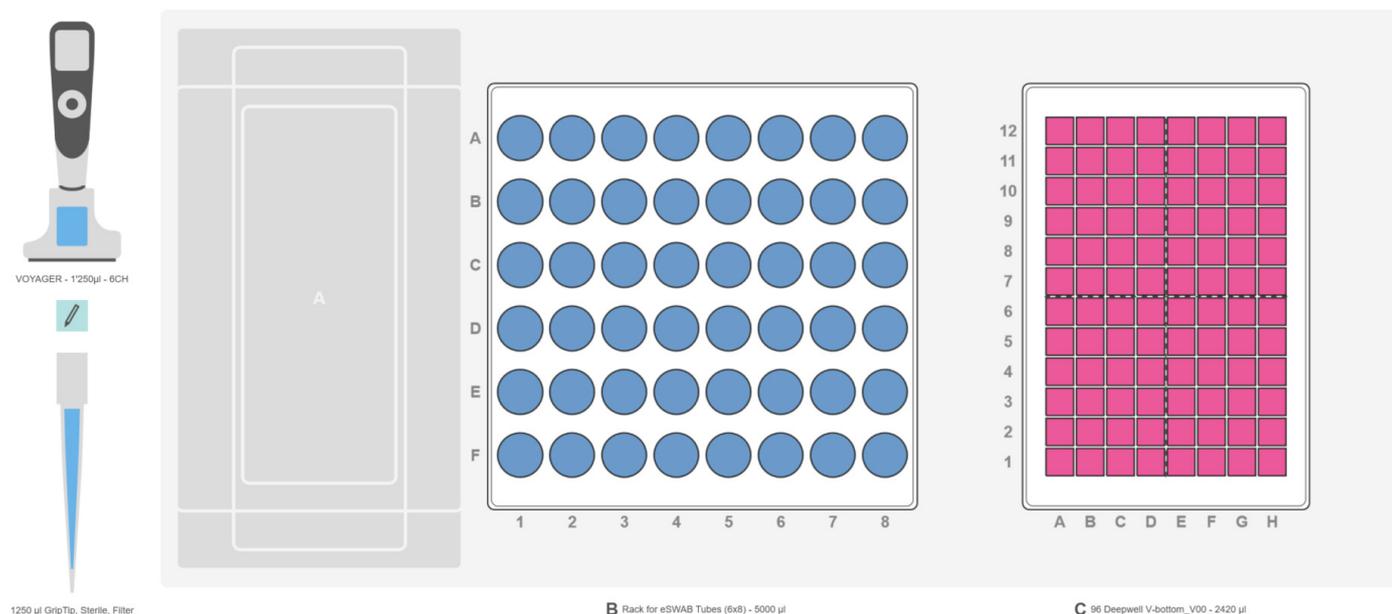
**STEP:** Sample transfer from swab tubes, to 96 deep well plate

**HOW TO:** First, place an INTEGRA swab tube rack containing the patient's samples on deck **position B** (Figure 8, blue) and an empty 96 deep well plate on deck **position C** (Figure 8, magenta).

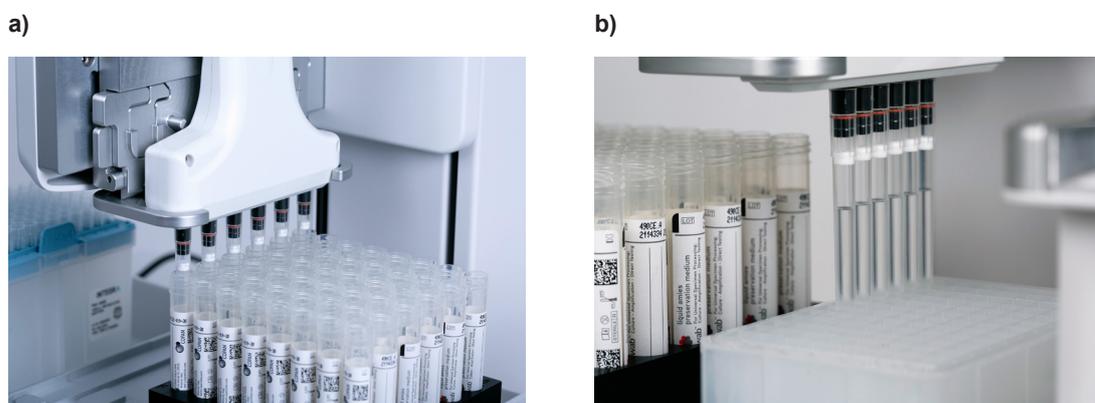
Select and run the VIALAB program 'Transfer\_from\_swab\_tubes'. A 6 channel 1250 µl VOYAGER pipette with 1250 µl Sterile Filter GripTips aspirates 1000 µl sample from the swab tubes, then dispenses into the 96 deep well plate. Tips are automatically changed between samples to avoid cross contamination. A 25 µl pre- and post-dispense is also set to ensure accurate and precise liquid handling, even if the preservation medium tends to form bubbles during pipetting. After filling the first six columns of the 96 deep well plate with samples, the pipette informs the operator to change the swab tube rack. The VOYAGER then continues to fill the second half of the 96 deep well plate with samples.

**Tip:**

- A 25 µl air gap has been set at the end of the aspiration to eliminate the risk of cross contamination.



**Figure 8:** Deck set-up for sample transfer from swab tubes to 96 deep well plate. **Position A:** Empty. **Position B:** INTEGRA rack for swab tubes. **Position C:** 96 deep well plate.



**Figure 9:** Sample transfer from a) swab tubes to b) a 96 deep well plate with VOYAGER pipette.

## 5. Transfer from test tubes

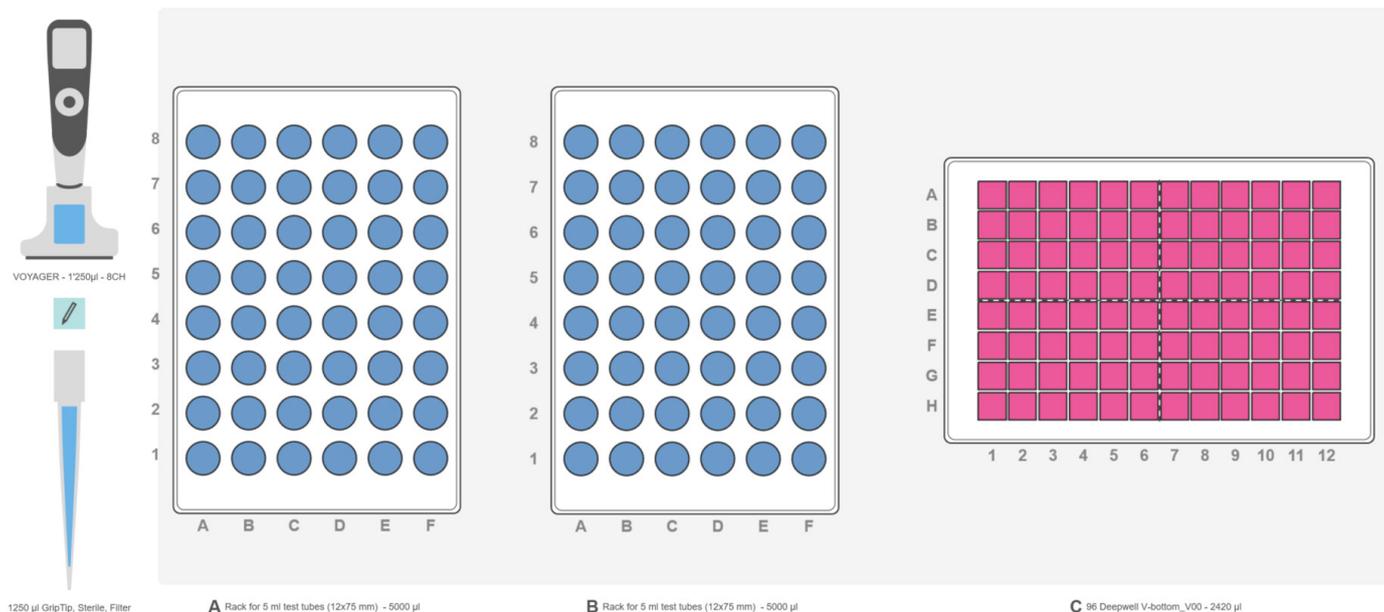
**STEP:** Sample transfer from 5 ml test tubes to a 96 deep well plate

**HOW TO:** First, put two INTEGRA 5 ml test tube racks with samples on deck **positions A and B** (Figure 10, blue), and an empty 96 deep well plate on **position C** (Figure 10, magenta). For this application, use an 8 channel 1250 µl VOYAGER pipette with 1250 µl Sterile Filter GripTips.

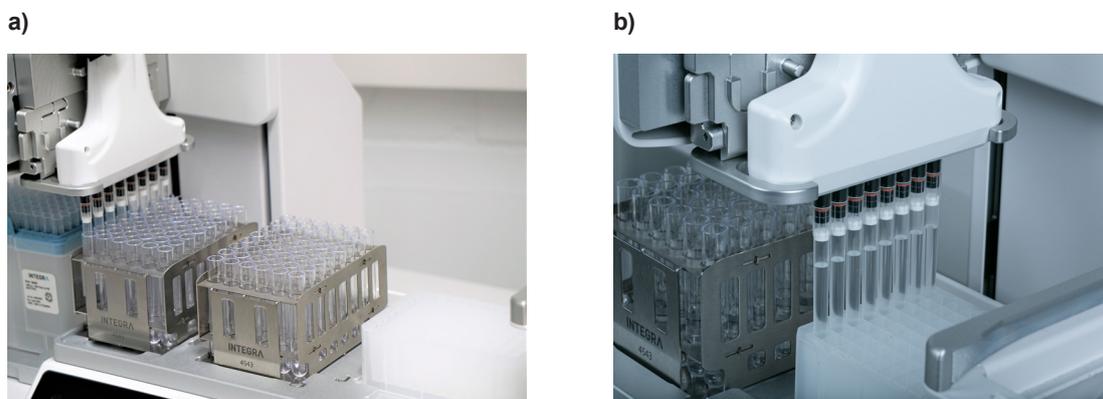
Select the custom VIALAB program 'Transfer\_from\_test\_tubes' on the pipette, and press Run. The pipette transfers 1000 µl of each sample from the test tubes to the 96 deep well plate after mixing three times.

**Tip:**

- Proper mixing of samples prior to transfer can be critical for certain sample types. The mixing volume, speed and number of cycles can be easily set up in the VIALAB program.



**Figure 10:** Deck set-up for sample transfer from 5 ml test tubes, to a 96 deep well plate. **Position A:** INTEGRA rack for 5 ml test tubes (blue). **Position B:** INTEGRA rack for 5 ml test tubes (blue). **Position C:** 96 deep well plate (magenta).



**Figure 11:** Sample transfer from a) 5 ml test tubes to b) a 96 deep well plate.

## 6. Transfer from centrifuge tubes

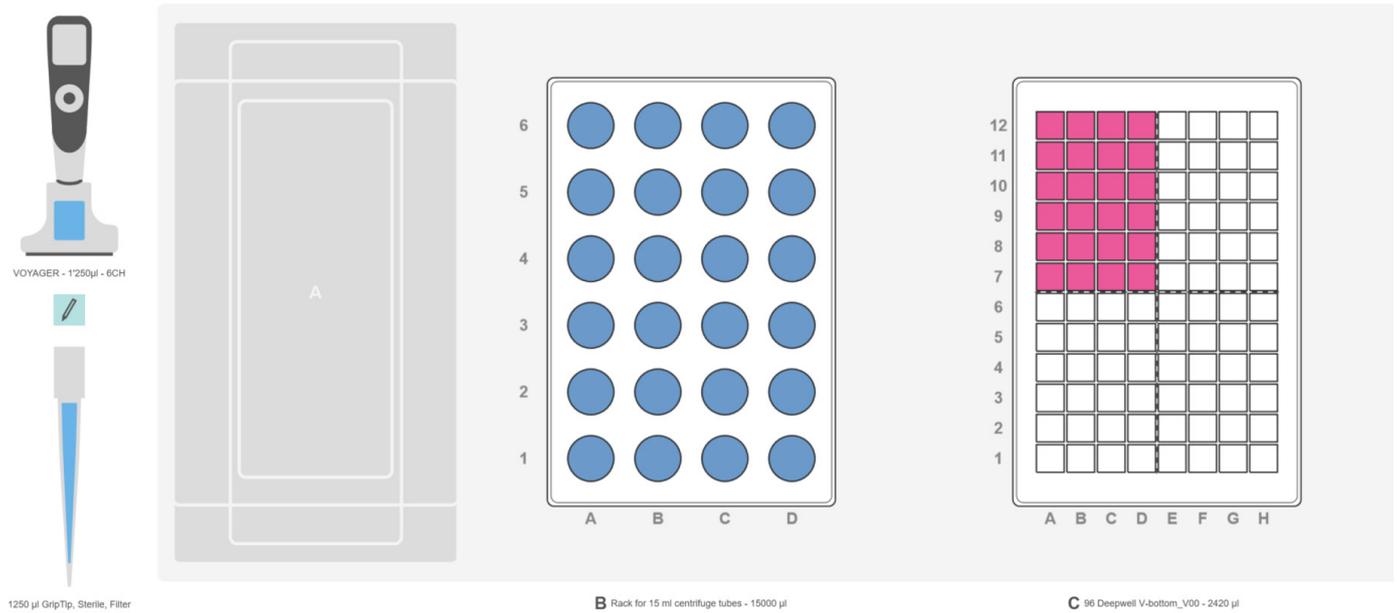
**STEP:** Sample transfer from 15 ml centrifuge tubes to a 96 deep well plate

**HOW TO:** Equip the ASSIST PLUS with a 6 channel 1250 µl VOYAGER pipette using 1250 µl Sterile Filter GripTips. Place an INTEGRA 15 ml centrifuge tube rack on deck **position B** (Figure 12, blue), and load all the sample tubes into the rack. Place an empty 96 deep well plate, in portrait orientation, on deck **position C** (Figure 12, magenta).

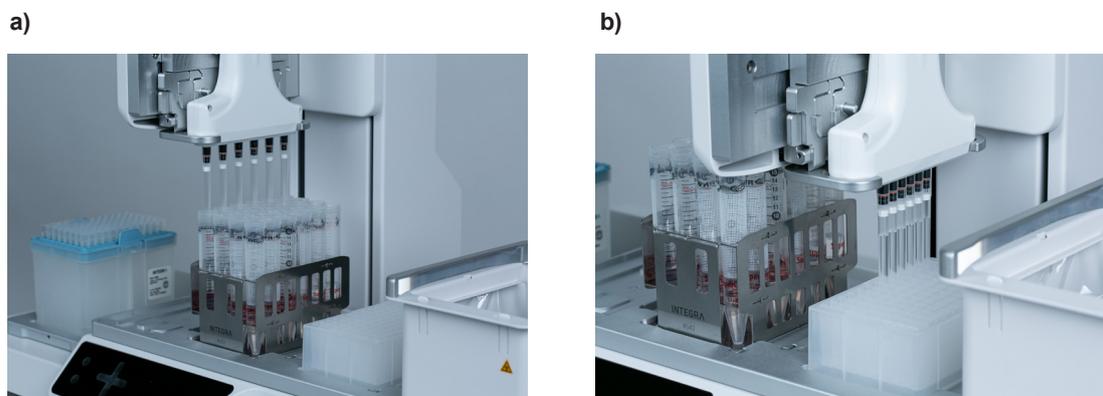
Choose and run the VIALAB program 'Transfer\_from\_centrifuge\_tubes' on the VOYAGER pipette. Samples in the centrifuge tubes are mixed three times, then 1000 µl of each sample is transferred to the deep well plate.

**Tip:**

- The tip travel function is used during the mixing steps to optimize tip immersion depth.



**Figure 12:** Set-up for sample transfer from 15 ml centrifuge tubes to a 96 deep well plate. **Position A:** Empty. **Position B:** INTEGRA rack for 15 ml centrifuge tubes (blue). **Position C:** 96 deep well plate (magenta).



**Figure 13:** Sample transfer from **a)** 15 ml centrifuge tubes to **b)** a 96 deep well plate.

## Remarks

### VIALAB software:

The VIALAB programs can be easily adapted to your specific protocols.

### Partial plates:

Programs can be easily adapted to accommodate different number of samples, providing complete versatility to meet current and future laboratory workflow demands.

## Conclusion

- The ASSIST PLUS pipetting robot, equipped with a VOYAGER adjustable tip spacing pipette, is the perfect solution to precisely transfer samples to and from different tube types, without the risk of transcription errors.
- The VOYAGER adjustable tip spacing pipette enables processing of multiple tubes in parallel, and is available with various channel options and volumes. This allows the user to pipette to the tube or plate of their choice, speeding up the transfers.
- The preprogrammed automated protocols provide simple, fast and ready-to-use solutions for six possible sample transfer processes to maximize walk-away time.
- If sterile conditions are required during sample transfer, the compact overall size and footprint of the ASSIST PLUS mean it can be placed in a laminar flow hood.
- The ASSIST PLUS is indispensable for users wishing to increase their throughput in sample processing.

## Materials

Manufacturer	Part Number	Description	Link
INTEGRA Biosciences	4505	ASSIST PLUS base unit	<a href="https://www.integra-biosciences.com/global/en/pipetting-robots/assist-plus">https://www.integra-biosciences.com/global/en/pipetting-robots/assist-plus</a>
INTEGRA Biosciences	4721	VOYAGER 8 channel 12.5 µl electronic pipette	<a href="https://www.integra-biosciences.com/global/en/electronic-pipettes/voyager">https://www.integra-biosciences.com/global/en/electronic-pipettes/voyager</a>
INTEGRA Biosciences	4723	VOYAGER 8 channel 300 µl electronic pipette	<a href="https://www.integra-biosciences.com/global/en/electronic-pipettes/voyager">https://www.integra-biosciences.com/global/en/electronic-pipettes/voyager</a>
INTEGRA Biosciences	4764	VOYAGER 6 channel 1250 µl electronic pipette	<a href="https://www.integra-biosciences.com/global/en/electronic-pipettes/voyager">https://www.integra-biosciences.com/global/en/electronic-pipettes/voyager</a>
INTEGRA Biosciences	4724	VOYAGER 8 channel 1250 µl electronic pipette	<a href="https://www.integra-biosciences.com/global/en/electronic-pipettes/voyager">https://www.integra-biosciences.com/global/en/electronic-pipettes/voyager</a>
INTEGRA Biosciences	4540	Rack for 1.5/2 ml microcentrifuge tubes	<a href="https://www.integra-biosciences.com/global/en/pipetting-robots/assist-plus">https://www.integra-biosciences.com/global/en/pipetting-robots/assist-plus</a>
INTEGRA Biosciences	4541	Rack for 0.5 ml microcentrifuge tubes	<a href="https://www.integra-biosciences.com/global/en/pipetting-robots/assist-plus">https://www.integra-biosciences.com/global/en/pipetting-robots/assist-plus</a>
INTEGRA Biosciences	4542	Rack for 15 ml centrifuge tubes	<a href="https://www.integra-biosciences.com/global/en/pipetting-robots/assist-plus">https://www.integra-biosciences.com/global/en/pipetting-robots/assist-plus</a>
INTEGRA Biosciences	4543	Rack for 5 ml test tubes	<a href="https://www.integra-biosciences.com/global/en/pipetting-robots/assist-plus">https://www.integra-biosciences.com/global/en/pipetting-robots/assist-plus</a>
INTEGRA Biosciences	4544	Rack for cryogenic tubes	<a href="https://www.integra-biosciences.com/global/en/pipetting-robots/assist-plus">https://www.integra-biosciences.com/global/en/pipetting-robots/assist-plus</a>
INTEGRA Biosciences	4545	Rack for 2 ml HPLC vials	<a href="https://www.integra-biosciences.com/global/en/pipetting-robots/assist-plus">https://www.integra-biosciences.com/global/en/pipetting-robots/assist-plus</a>

## Materials

Manufacturer	Part Number	Description	Link
INTEGRA Biosciences	4546	Rack for swab tubes	<a href="https://www.integra-biosciences.com/global/en/pipetting-robots/assist-plus">https://www.integra-biosciences.com/global/en/pipetting-robots/assist-plus</a>
INTEGRA Biosciences	6250	PCR 96 well cooling block	<a href="https://www.integra-biosciences.com/global/en/pipetting-robots/assist-plus">https://www.integra-biosciences.com/global/en/pipetting-robots/assist-plus</a>
INTEGRA Biosciences	6455	12.5 µl Sterile, Filter Grip Tips	<a href="https://www.integra-biosciences.com/global/en/pipette-tips/griptip-selector-guide">https://www.integra-biosciences.com/global/en/pipette-tips/griptip-selector-guide</a>
INTEGRA Biosciences	6435	300 µl Sterile, Filter Grip Tips	<a href="https://www.integra-biosciences.com/global/en/pipette-tips/griptip-selector-guide">https://www.integra-biosciences.com/global/en/pipette-tips/griptip-selector-guide</a>
INTEGRA Biosciences	6445	1250 µl Sterile, Filter Grip Tips	<a href="https://www.integra-biosciences.com/global/en/pipette-tips/griptip-selector-guide">https://www.integra-biosciences.com/global/en/pipette-tips/griptip-selector-guide</a>
Copan	490CE.A	Swab tubes, autom. LQ Amies reg. nylon flocked applicator	<a href="https://www.copanusa.com/sample-collection-transport-processing/eswab/">https://www.copanusa.com/sample-collection-transport-processing/eswab/</a>
Greiner Bio-One International	780270	Masterblock, 96 well, 2 ml, V-bottom	<a href="https://shop.gbo.com/en/switzerland/products/bioscience/microplates/polypropylene-storage-plates/96-well-masterblock-2ml/780270.html">https://shop.gbo.com/en/switzerland/products/bioscience/microplates/polypropylene-storage-plates/96-well-masterblock-2ml/780270.html</a>
Greiner Bio-One International	126280	CRYO.S, 2 ml	<a href="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">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</a>
Greiner Bio-One International	655161	96 Well Microplate, PS, F-Bottom	<a href="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">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</a>
Greiner Bio-One International	616201	Reaction Tube, 1.5 ml, PP, Natural, Attached Cap	<a href="https://shop.gbo.com/en/switzerland/products/bioscience/reaction-tubes-analyser-cups/bs-reaction-tubes/616201">https://shop.gbo.com/en/switzerland/products/bioscience/reaction-tubes-analyser-cups/bs-reaction-tubes/616201</a>
Greiner Bio-One International	667201	Reaction Tube, 0.5 ml, with Attached Cap	<a href="https://shop.gbo.com/en/switzerland/products/tribution/5_0060/5_0060_0130/5_0060_0130_0030/5_0060_0130_0030_0010/667201.html">https://shop.gbo.com/en/switzerland/products/tribution/5_0060/5_0060_0130/5_0060_0130_0030/5_0060_0130_0030_0010/667201.html</a>
Carl Roth	TY80.1	Sample vials ROTILABO®	<a href="https://www.carlroth.com/ch/en/autosampler-vials-sample-bottles/sample-vials-rotilabo-with-snap-on-ring-nd11/p/ty80.1">https://www.carlroth.com/ch/en/autosampler-vials-sample-bottles/sample-vials-rotilabo-with-snap-on-ring-nd11/p/ty80.1</a>
Greiner Bio-One International	652270	Sapphire microplate, 96 well, PP	<a href="https://shop.gbo.com/en/switzerland/products/bioscience/molecular-biology/pcr-microplates/652270.html">https://shop.gbo.com/en/switzerland/products/bioscience/molecular-biology/pcr-microplates/652270.html</a>
Greiner Bio-One International	115101	Tube, 5 ml, PS	<a href="https://shop.gbo.com/en/switzerland/products/bioscience/tubes-beakers/polystyrene-tubes-round-bottom/115101.html">https://shop.gbo.com/en/switzerland/products/bioscience/tubes-beakers/polystyrene-tubes-round-bottom/115101.html</a>
VWR International	525-1084	Centrifuge tubes, Ultra-High Performance, Sterile, PP	<a href="https://ch.vwr.com/store/product/en/26825109/centrifuge-tubes-ultra-high-performance-vwr">https://ch.vwr.com/store/product/en/26825109/centrifuge-tubes-ultra-high-performance-vwr</a>

**INTEGRA Biosciences AG**  
7205 Zizers, Switzerland  
T +41 81 286 95 30  
F +41 81 286 95 33  
info@integra-biosciences.com

**INTEGRA Biosciences Corp.**  
Hudson, NH 03051, USA  
T +1 603 578 5800  
F +1 603 577 5529  
info-us@integra-biosciences.com

**INTEGRA Biosciences Deutschland GmbH**  
35444 Biebertal, Deutschland  
T +49 6409 81 999 15  
F +49 6409 81 999 68  
info-de@integra-biosciences.com

**INTEGRA Biosciences SAS**  
95062 Cergy-Pontoise Cedex 1, France  
T +33 (0)1 34 30 76 76  
F +33 (0)1 34 30 76 79  
info-fr@integra-biosciences.com

**INTEGRA Biosciences Ltd.**  
Egham, Surrey TW20 9EY, UK  
info-uk@integra-biosciences.com