

# La robotisation pour la préparation des échantillons

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# Préparation classique des échantillons



Pipetage manuel pour préparer les échantillons



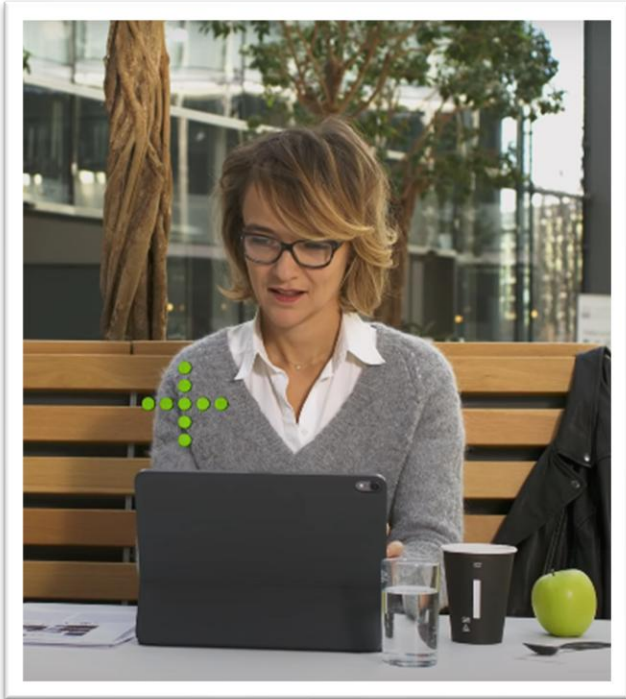
Analyses via chromatographie



Analyses via spectrométrie de masse

Alors que les analyses sont automatisées, la préparation des échantillons ne l'est pas → **Source d'erreurs**

## Le défi



*QC Manager*

- *Ma société souhaite accélérer le développement des projets*
- *Réduire les risques d'erreurs*
- *Cependant, nous devons le faire tout en:*
  - *Conservant l'absolu qualité des données analytiques*
  - *Préservant autant que possible les procédures opérationnelles normalisées (PON)*

Besoin d'une solution **facile à utiliser** et **intuitive** pour seconder les techniciens de laboratoire.

# Modern Day Laboratory Challenges



## Assay Repeatability

Reproducibility & Accuracy



## Standardized Protocols

Throughout Users, Labs, and Sites



## Traceability & Compliance

Costly Errors and Usability Challenges in GxP/Regulated Environment



## Productivity & Efficiency

Effectiveness of the Laboratory



## Ergonomics

Incidences of Repetitive Strain Injury (RSI)

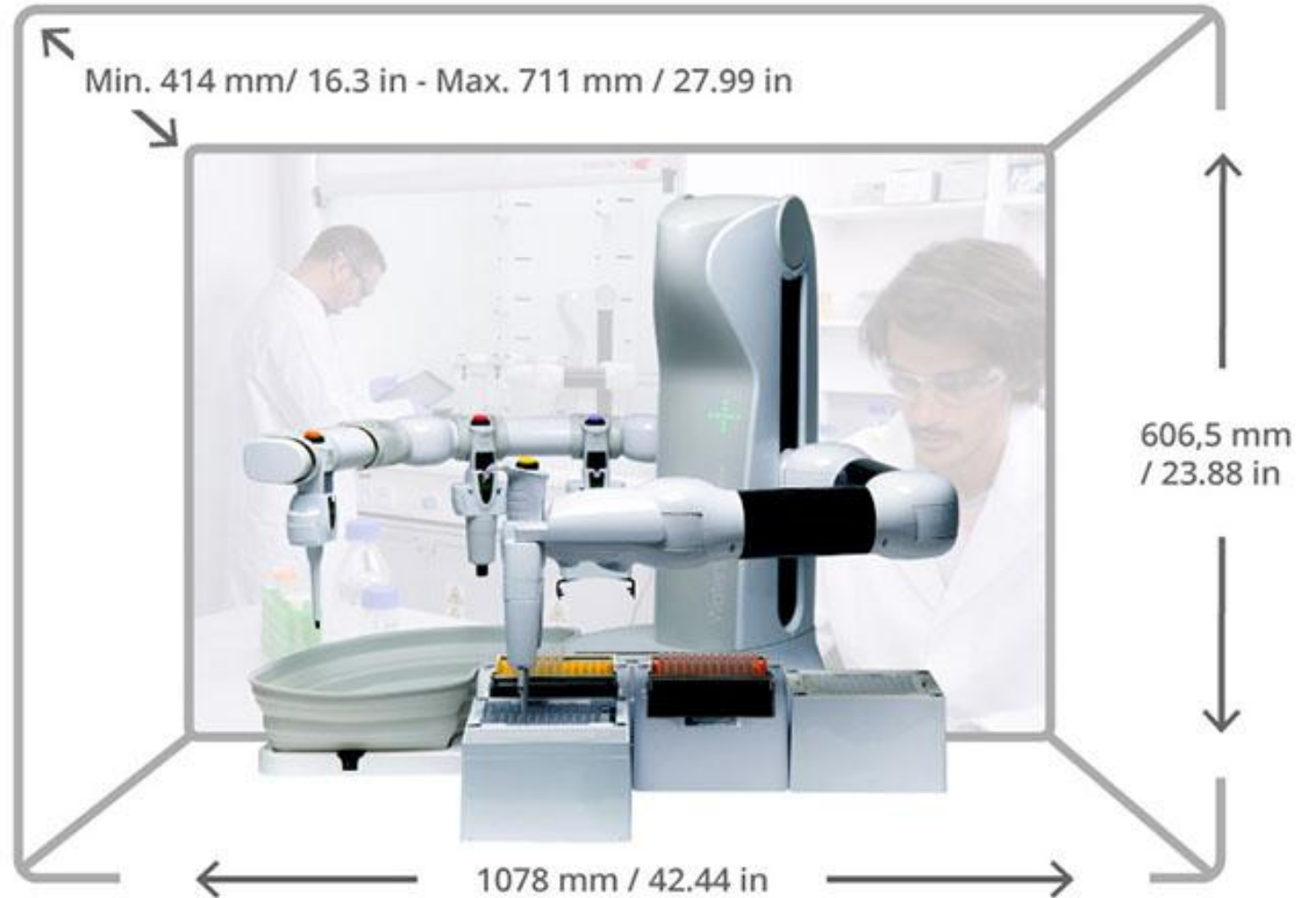
La solution? Andrew+



# Andrew

the pipetting robot

- Pipettes monocanaux & 8-canaux
  - Pipettes de Sartorius
  - Large choix pour les volumes : 0.2  $\mu$ L à 10 mL
- Facile de developper vos protocoles via notre software OneLab
  - Création
  - Exécution
- Flexibilité du robot avec un grand nombre de :
  - Dominos
  - Gripper
  - Dominos actifs
  - Consommables



# Flexibilité de pipetage

## Single Channel



- 0.2-10 µL
- 5-120 µL
- 10-300 µL
- 50-1,000 µL
- 100-5,000 µL
- 500-10,000 µL

## Multi-Channel



- 0.2-10 µL
- 5-120 µL
- 10-300 µL
- 50-1,200 µL

## Modes de pipetage

Valable pour chaque pipette

Pipetting	✓
Reverse Pipetting	✓
Manual Pipetting	✓
Multi Dispensing	✓
Diluting	✓
Sequential Dispensing	✓
Multi Aspiration	✓
Titrate	✓

# Les Dominos : l'espace de travail du robot

**OneLab**   
design & execute

Build A  
System  
For Your  
Application

Microplates



Reservoirs



Columns, Reaction Blocks



Tubes/Bottles



# Les Dominos actifs pour plus de flexibilité

## Peltier+



### Fast Heating and Cooling

Rapid cooling down to 0°C and heating up to 99°C

## Vacuum+



### Automated Solid Phase Extraction

Enhanced vacuum control designed for use with Waters uElution plates

## Magnet+



### Simple, Reliable Separation

Avoid centrifugation, a bottleneck in many automated processes

## Shaker+



### Rapid, Precise Mixing

Vibration free motion ensures highest mixing speeds on market  
200-3000 rpm

# Extraction



- SPE totalement automatisée : aucune manipulation à faire!
- Compatible avec micro & macro-elution plates
- Compatibilité avec les cartouches de 1cc, 3cc and 6cc
- Contrôle du profil de pression
- Peut être utilisé par le robot et nos gripper



# Andrew

the pipetting robot



## Examples



AccQ-Tag Ultra LC **Amino Acid** Analysis



Immunosuppressant sample prep

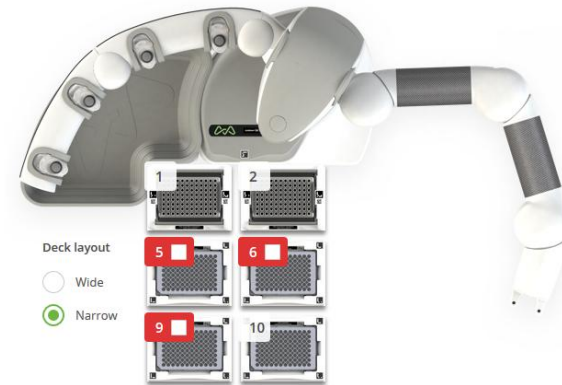


Associates of Cape Cod, Inc.

Fungitell® **Glucan** Detection Assay



Sample Preparation of mAbs  
for **Middle-level** Analysis



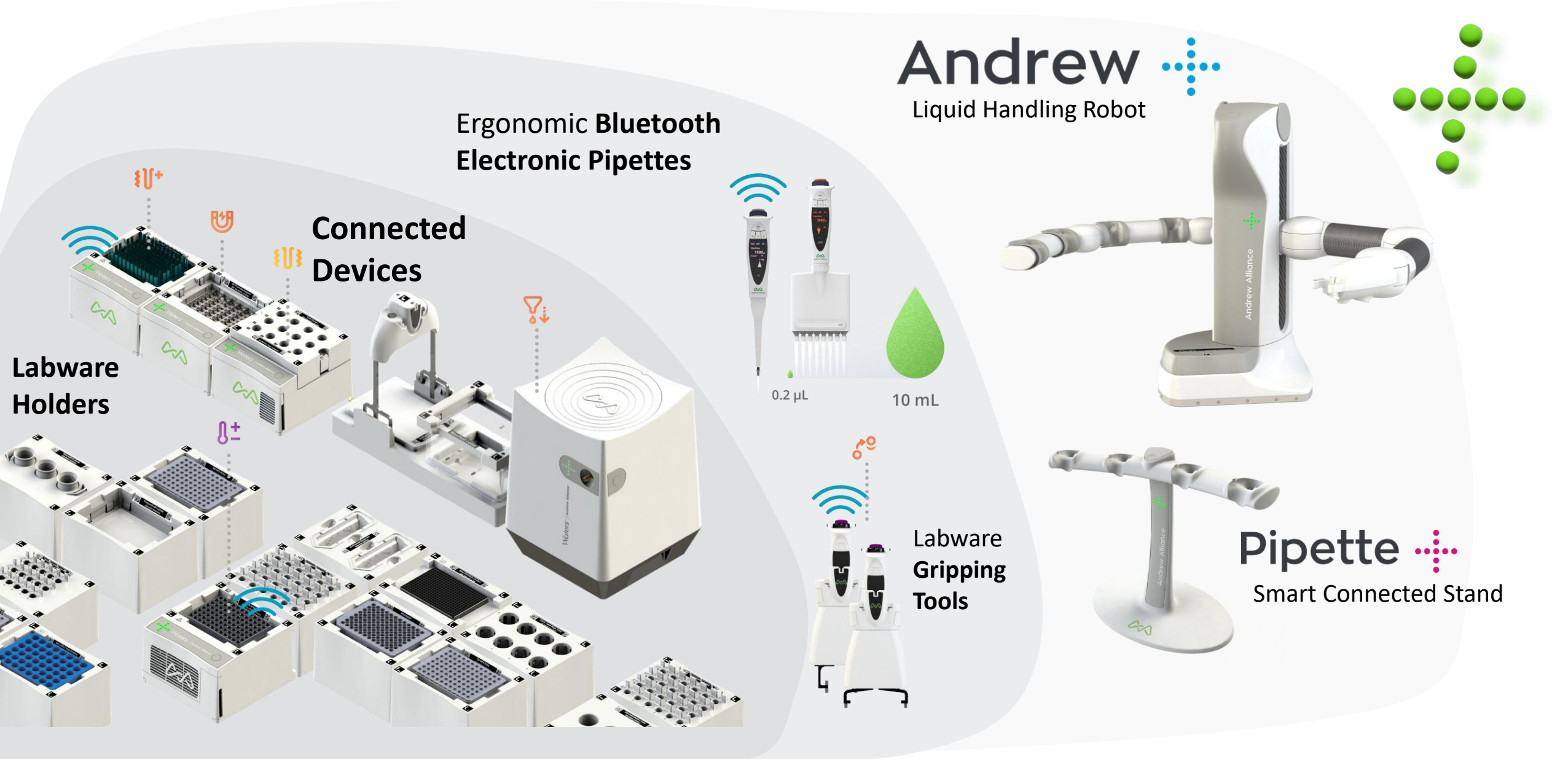
96-Well **PCR** Master Mix Setup

Waters™

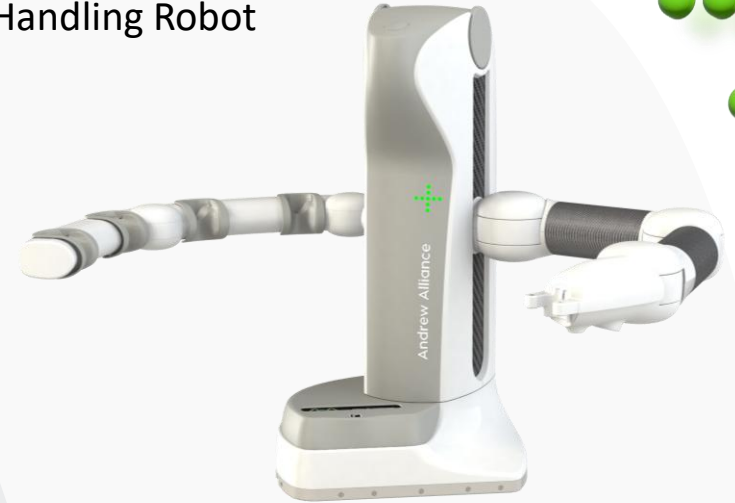


**OneLab: Le logiciel pour un laboratoire connecté**

# OneLab Evolving Connected Environment



**Andrew**  
Liquid Handling Robot



**Ergonomic Bluetooth  
Electronic Pipettes**



**Connected  
Devices**



**Labware  
Holders**



**Labware  
Gripping  
Tools**



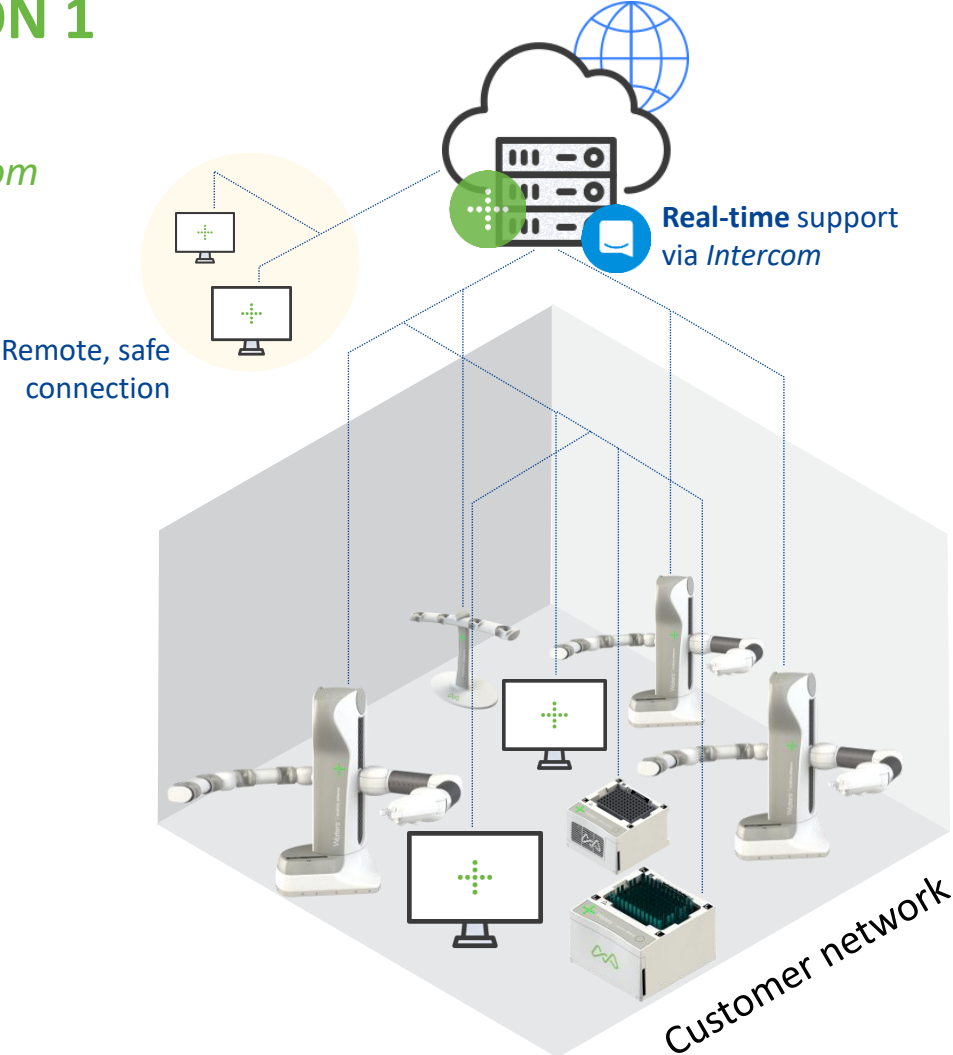
**Pipette**  
Smart Connected Stand



# Les différents déploiements de OneLab

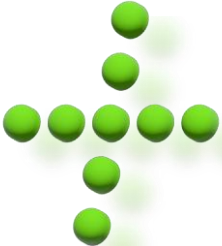
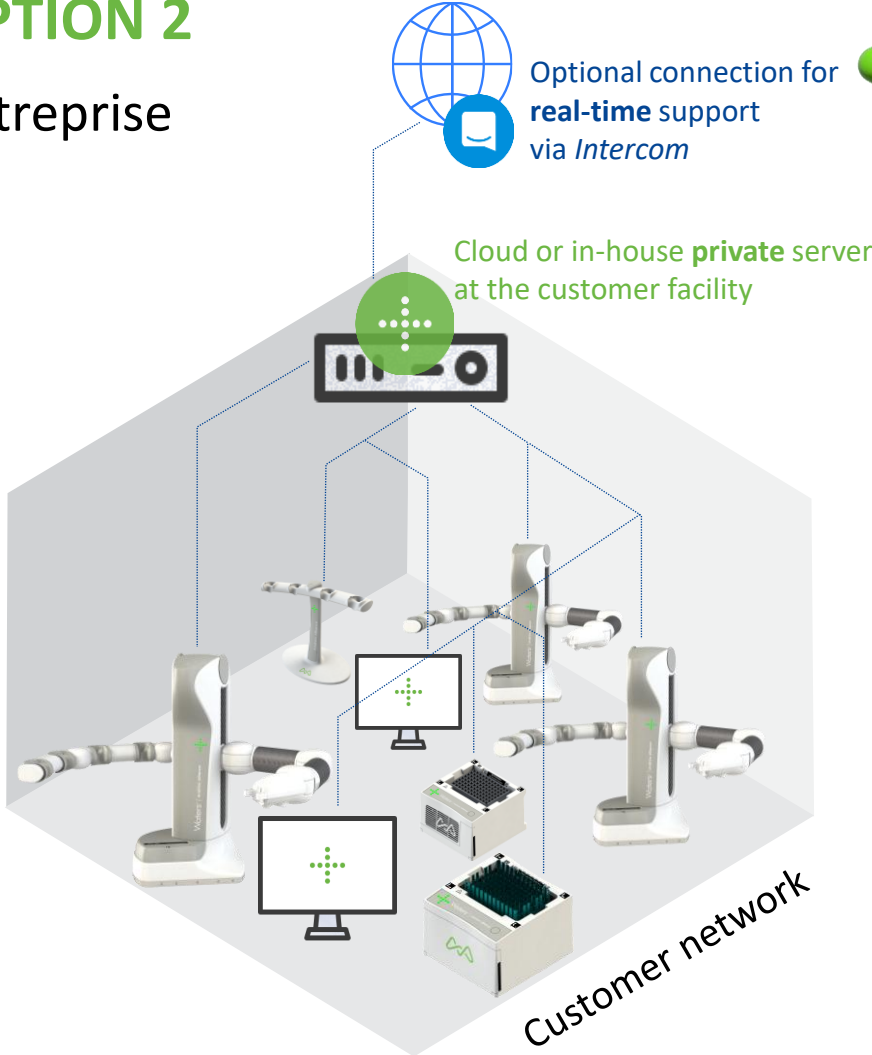
## OPTION 1

SaaS  
*onelab.com*



## OPTION 2

Entreprise



# La creation des protocoles via OneLab

## 1) Choisir les consommables avec lesquels travailler

✕ Add labware to the bench

Search by name, reference, ...

ALL TUBES & VIALS MICROPLATES BOTTLES & RESERVOIRS MICROCHIPS & DEVICES COLUMNS

Filters

- Number of wells
  - 1 6 8
  - 12 24 36
  - 48 54 60
  - 96 384
- Well capacity
  - < 100 uL 100 uL - 1 mL
  - 1 mL - 50 mL
  - 50 mL - 250 mL > 250 mL
- Device compatibility
  - Absorbance plate reader
  - Andrew+
  - Heater-Shaker+
  - Magnet+
  - Peltier+
  - Shaker+
  - Vacuum+
  - PCR thermal cycler
  - Photoredox

Frequently used items

- Fisherbrand™ Premium 1.5 mL microtube [Add](#)
- Falcon® 50 mL conical centrifuge tube [Add](#)
- Falcon® 15 mL conical centrifuge tube [Add](#)
- Fisherbrand™ 2 mL skirted conical microtube [Add](#)
- 10 mL flat-bottom screw cap test tube [Add](#)
- 13x84mm collection tube, virus preservation... [Add](#)
- 16x100mm collection tube, COPAN UTM®... [Add](#)
- 16x100mm collection tube, IMPROVIRAL™... [Add](#)
- 16x100mm collection tube, virus preservation... [Add](#)
- 2 mL flint glass vial [Add](#)
- ACC, Pyrotube® 16x90mm depyrogenated... [Add](#)
- Agilent 12x32mm screw-top vial, 0.3 mL insert in Water... [Add](#)
- Agilent 2 mL 12x32mm crimp-top vial [Add](#)
- Agilent 2 mL 12x32mm crimp-top vial in Genevac 48... [Add](#)
- Agilent 2 mL 12x32mm crimp-top vial in Waters 48x... [Add](#)
- Agilent 2 mL 12x32mm screw-top vial in 54x vial plate [Add](#)
- Agilent 2 mL 12x32mm screw-top vial in Vanquish™... [Add](#)
- Axygen® 1.5 mL Maxymum Recovery® snaplo... [Add](#)

3 labware to add on the bench

- Fisherbrand™ Premium 1.5 mL microtube [Add](#)
- Eppendorf twin.tec® 96-well skirted LoBind®... [Add](#)
- INTEGRA 10 mL multichannel reservoir [Add](#)

Fisherbrand™ Premium 1.5 mL microtube

Labware representation

[Add to labware list](#) [Manufacturer data](#)

Labware part number	11926955
Max volume	1.6 mL
Working volume	1.5 mL
Dead volume	20 µL
Bottom shape	V-shaped
Labware manufacturer	Fisher Scientific
Closure	Snap cap
Sterility requirements	Autoclavable, DNase-Free, RNase-Free, Pyrogen-Free
Material	PP
Surface treatment	Highly polished
Color	Clear

Compatible labware holders

- Microtube 218.2152 [Available in this lab](#)
- 1.5mL Microtube Cooled 218.2451

Compatible pipettors

1-channel pipettes

Channel / volume range (µL)	Requirements
1-ch 0.2-10 µL SKU: 186009769	Fully compatible <a href="#">Available in this lab</a> <a href="#">Shop on waters.com</a>

# La creation des protocoles via OneLab

## 2) Créer les étapes de pipetage en utilisant uniquement le “cliquer-deposer”

Kairos Derivatization, 48 Samples - Andrew+ v. 1 Execute

AccQ-Tag 3x Label

Eppendorf twin.tec® 96-well plate

Waters 2 mL 96-well collection plate

Agilent 6-column reagent reservoir

INTEGRA 10 mL multichannel reservoir

STEPS LABWARE INFO

1700 rpm after 10 seconds

20. Dispense 1 mL from AccQ-Tag 3x Label to INTEGRA 10 mL multichannel reservoir

21. Dispense 500 µL from AccQ-Tag 3x Label to INTEGRA 10 mL multichannel reservoir

Leftover of 0 µL in source AccQ-Tag 3x Label (deadvolume: 20 µL).

22. Dispense 20 µL from INTEGRA 10 mL multichannel reservoir to Eppendorf twin.tec® 96-well plate A1:H1

23. Dispense 20 µL from INTEGRA 10 mL multichannel reservoir to Eppendorf twin.tec® 96-well plate A2:H2

24. Dispense 20 µL from INTEGRA 10 mL multichannel reservoir to Eppendorf twin.tec® 96-well plate A3:H3

25. Dispense 20 µL from

# La creation des protocoles via OneLab



## 3) Paramétrer les étapes de pipetage

### Pipetting mode

Forward  Reverse  Repetitive mode ⓘ

Blow-out ⓘ

Pause before blow-out

### Handling liquid viscosity

Pipetting speed fine adjustment

### Aspiration speed

Slow  Normal  Fast

### Dispensing speed

Slow  Normal  Fast

### Air cushion

No air cushion

Air top cushion (high viscosity aspiration) ⓘ

Air bottom cushion (low viscosity aspiration) ⓘ

### Pipette moving speed ⓘ

Slow  Normal

### Tip position ⓘ

#### Sources

With respect to liquid  
 With respect to bottom  
 Avoid touching bottom

#### Destinations

On-the-fly  
 With respect to liquid  
 With respect to bottom  
 Avoid touching bottom

### Tip choice ⓘ

Change tip at the beginning

Change tip between pipetting steps

Use tips with filter

### Mixing ⓘ

Sources

#### Mixing

[-] 3 times [+]

#### Speed

Slow  Normal  Fast

#### Volume

0  $\mu$ L

Destinations

#### Mixing

[-] 3 times [+]

#### Speed

Slow  Normal  Fast

#### Volume

0  $\mu$ L

### Automation

#### Mechanical arm motion speed

Normal  Fast

#### Custom tip position ⓘ

##### Sources *With respect to liquid*

Customized aspiration height

[-] 0 mm [+]

##### Destinations *With respect to liquid*

Customized dispensing height

[-] 0 mm [+]

#### Tip geometry control

Verify each tip used ⓘ

### Guidelines

Normal : **B** *I* U ☰ ☷ ☹ ☎ 📷 📅


Provide additional guidance about the execution of this step, e.e. how to proceed etc.













# La creation des protocoles via OneLab

## 4) Ajouter des actions pour utiliser les Dominos actifs

### Actions

Select an action to apply on labware



 Pipetting	 Serial dilution	 Concentration normalization
 Centrifugation	 Apply magnetic field	 Flow-through extraction
 Vortexing	 Shaking	 Heat / cool
 Discard Solution	 Timer	 User action / notification

### 2. Serial dilution


Drag required labware for serial dilution Continue

Patient 1 Patient 2 Patient 3

Patient 4 Patient 5 Patient 6

Patient 7 Patient 8

	1	2	3	4	5	6	7	8	9	10	11	12
A	●	○	○	○	○	○	○	○	○	○	○	○
B	●	○	○	○	○	○	○	○	○	○	○	○
C	●	○	○	○	○	○	○	○	○	○	○	○
D	●	○	○	○	○	○	○	○	○	○	○	○
E	●	○	○	○	○	○	○	○	○	○	○	○
F	●	○	○	○	○	○	○	○	○	○	○	○
G	●	○	○	○	○	○	○	○	○	○	○	○
H	●	○	○	○	○	○	○	○	○	○	○	○



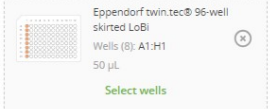
Buffer

You want to dilute: ⓘ

One sample

A column of 8 samples


— Samples to dilute



Select wells

Drop one compatible labware


— Dilution buffer



Buffer  
AUTO (250 µL)

Drop one compatible labware

— Destinations



Select wells

Drop one compatible labware

## 5) Exécuter le protocole

Execution of:  Démo sur site

 Edit protocol  Step list  Cancel

### Select the number of samples

Minimum 1 sample, maximum 8 samples

The maximum number is based on the sample references listed in the protocol

Adapt for 8 samples

or

### Import a protocol worklist file (.csv)

 **Help:** Prepare your protocol worklist for execution

[Download template](#) to create a compatible import file

Drag and drop a csv file



Select a csv file

Alternatively, you can execute the protocol with the existing parameters

Execute original protocol

# La creation des protocoles via OneLab

## 6) Organiser votre paillasse et importer votre liste d'échantillons

Execution of: Démo sur site with Andrew+ Andrew+ Demo Emma

Cancel

Settings

Step list

Start experiment

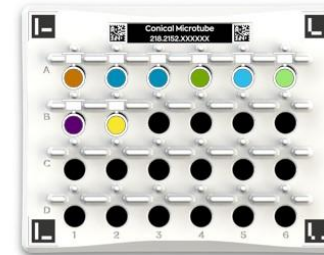
Bench preparation

Deck layout  
 Wide  
 Narrow



Block  
9

Microtube  
218.2152.XXXXXX



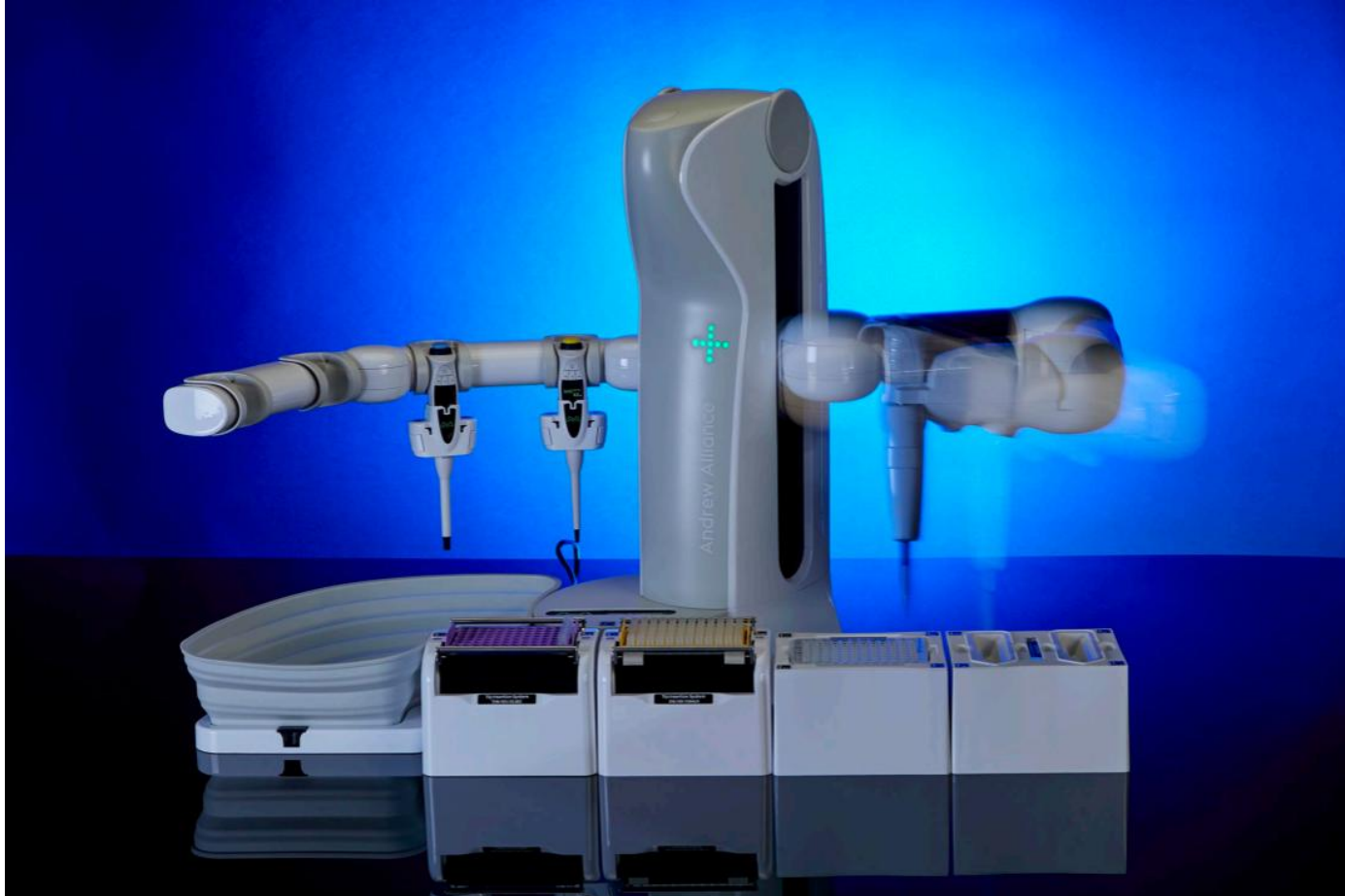
Import sample information

Labware, Position	Solution	Concentration	Volume
 « Patient 1 » Fisherbrand™ Premium 1.5 mL microtube			+ Labware ID
	<span style="color: orange;">●</span> Sample Patient 1	3 µM	> 500 µL
	+ Sample ID		<input type="text" value="500"/> µL
	patient 0		

 « Patient 2 » + Labware ID

Labware volume checked

# La robotisation : une plus-value exceptionnelle



**Andrew**   
the pipetting robot



**Easy deployability**

**Lab productivity**

**Reproducibility** between assays

**Comparability** between manual and automated preparations

**Reliable** sample preparation

**Simple & easy** automation

Minimizes **error!**

Walk-away **time!**



Waters™