

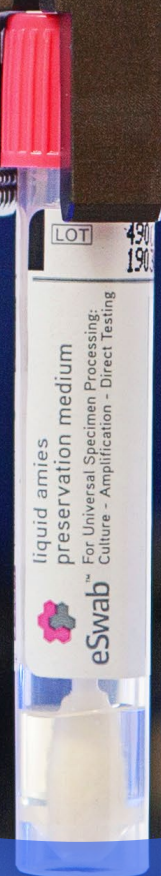
Clinical applications

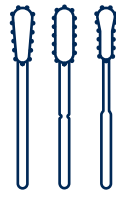
Clinical bacteriology automation

Clinical bacteriology automation

Express your lab's full potential by automating your routine.

Envisioning a Full microbiology
Lab Automation.





Collection



Transport



Processing



Artificial Intelligence

Our comprehensive approach to preanalytics

What is automation?

Technology in service of people

We envision **efficient labs** where the quality of results is sky-high. At Copan, automation is the core of this dream. From the Greek αὐτόματος – acting of itself, moving or acting on its own – automation etymological sense is too limiting: even though our set of advanced AI and hardware modules are in the service of the lab's daily tasks, **your staff, needs, and rules are still at the center of every process.**

A demanding daily routine

Each day, in every clinical laboratory, **thousands of data and processes intertwine with each other in constant cooperation**, leading to therapy-driving results. It is crucial to tackling this complex operational weave in the most efficient way possible, in all its parts:

- **Data** – patient individual information, protocols, results from previous analyses.
- **Processes** – handle samples and reagents, aliquot, transport, incubate and interpret data.
- **Decisions** – lab management decisions and the diagnosis.

To keep these data, processes, and decisional inaccuracies as negligible as possible and ensure a precise, reproducible diagnosis, laboratory staff must adopt time-consuming measures every day.



From sample collection to image analysis and automated colony picking

Our comprehensive approach to preanalytics

Automation is undoubtedly one of the most important advancements that occurred in clinical laboratories over the past decade. Its evolution, digital automation, offers now the opportunity to connect multiple lab instruments, multiple specialty labs, and even multiple labs scattered across the globe. While providing significant long-term cost savings and staff requalification, **automation enables improved efficiency, organization, standardization, and laboratory testing safety**. Laboratory automation is only a part of Copan's comprehensive approach to preanalytics; our line of **liquid-based microbiology collection and transport systems can be paired with our automation solutions, unlocking your lab's real potential** and accompanying you from sample collection to data interpretation in a smoother and more efficient way.



A sleepless and accurate assistant

Full laboratory Automation (FLA) combines into an integrated system the complete automatization of preanalytics, analytics, and data interpretation, with minimal human intervention and many advantages. **Automation performs repetitive tasks rapidly and accurately, reducing process errors for unparalleled precision and reproducibility.**

Also, machines never sleep, enabling laboratories to switch to a 24/7 schedule.

Can you imagine?

You could enter the lab in the morning with all the routines already performed autonomously during the night: more time for you to focus on essential tasks and reduced time to results.

Labs worldwide – from large to small, low to high throughput, reference to hospital-based laboratories – are exploring or **deploying various degrees of FLA with unquestionable benefits** – including error reduction – from clinical chemistry to immunology and molecular biology^{1,2,3}.

FLA in microbiology

Get prepared for what's next!

Microbiology labs criticalities are the same as any other lab. In the same way, they can **enormously benefit from FLA implementation**. According to a recent multicenter study⁴, Full Lab Automation can almost double microbiology labs' productivity and halve the cost per specimen – regardless of the lab size, load, and location – reducing the median turnaround time of 14 h (Figure 1)⁴.

Full Lab Automation enables a **24/7 processing** and culture workup schedule, and AI interpretative algorithms allow technologists to **review images in batch** mode for a more efficient release of significant cultures or **interpret** plates and antibiotic sensitivity results in a flash. Even if human and economic resources decline in the future, incorporating these and new tools will empower the microbiology community – and your lab – to provide high-quality results ever more rapidly.

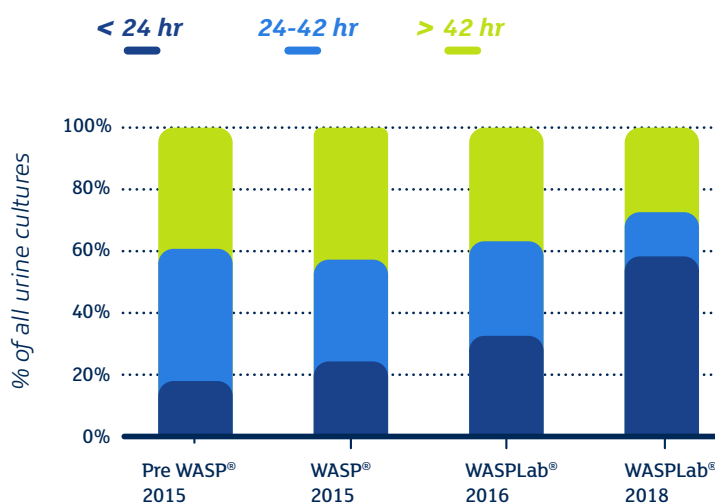


Figure 1: TAT frequency distribution with WASP® and Full Lab Automation

From sample processing to image analysis

We started our microbiology automation journey back in 2007 when it was still far from most people's thoughts. Over these years, **we built a preanalytical automation system that begins at the streaking phase and** – combining hardware modules with integrated image analysis software – **takes care of streaking, reading, interpreting and picking activities:** a real Full Lab Automation⁴!



Innovation

New ideas, creativity, internal and external know-how are the engine of our work. We strive every day to bring you something unique.



Modularity

All our automation solutions are designed to be flexible and meet any workflow, volume, or protocol need.



Productivity

We believe in automatization as the solution to reduce time to results and increase your lab's throughput.



Quality

As volumes rise and the laboratory grows, our automation systems are designed to boost the quality and level of service.



Traceability

When processing loads of samples per day, it is crucial to keep everything under control. For this, we design our products to integrate seamlessly with your LIS.

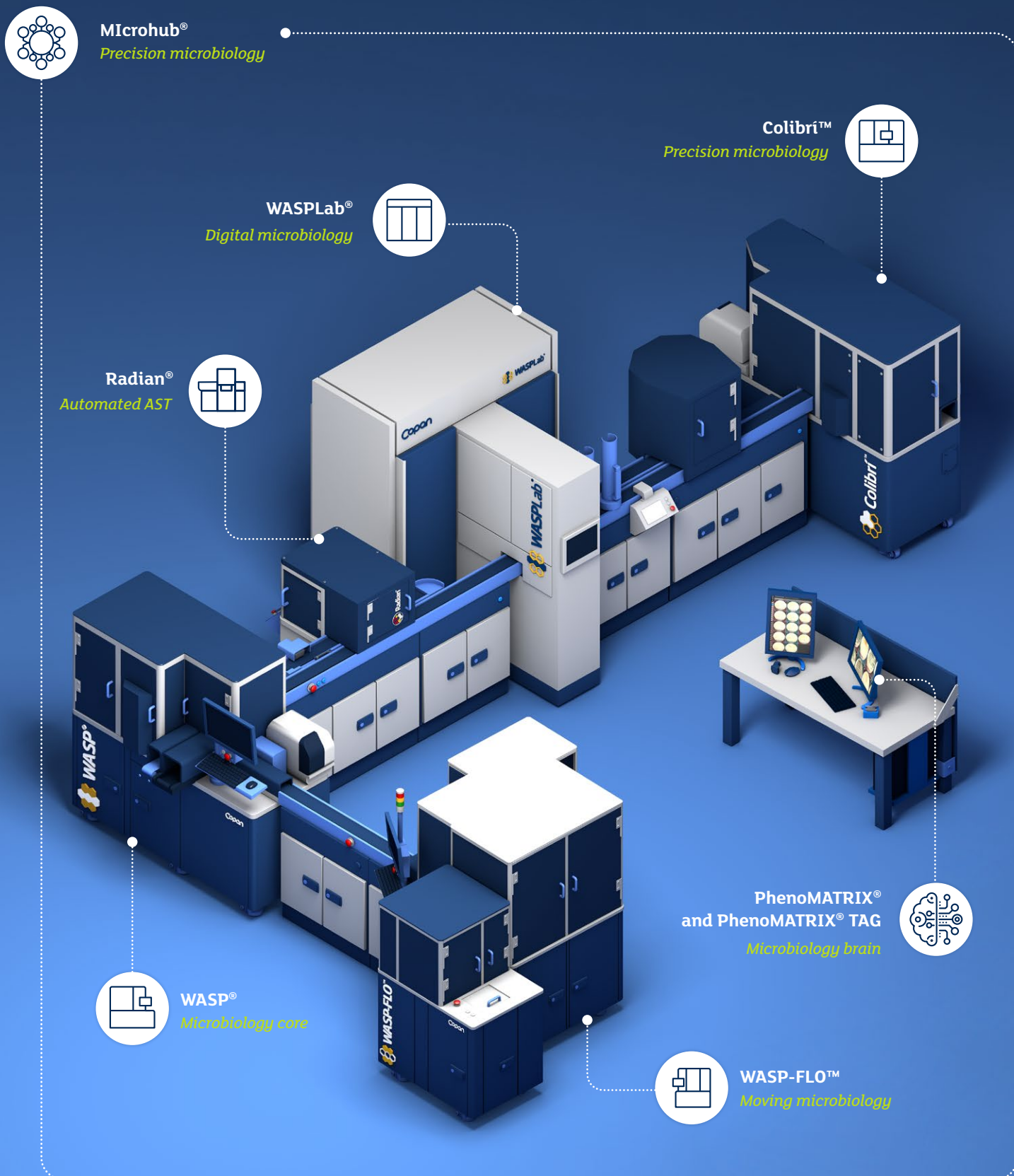


Valorization

The expertise, experience, and commitment of your staff are your most valuable assets. By automating routine tasks, we aim to give value to your personnel by letting them focus on tasks that matter, for them as for patients.

The WASPLab® world

The leading microbiology ecosystem





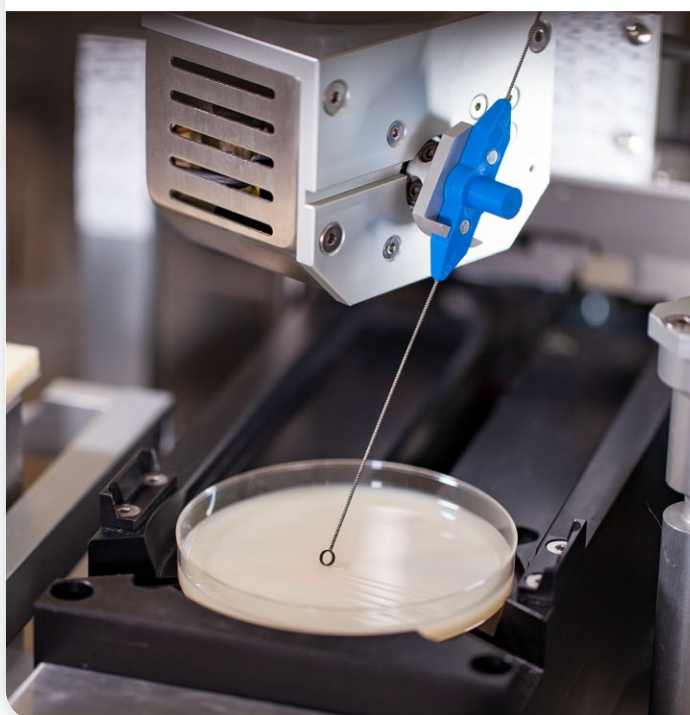
The microbiology core



WASP®

The microbiology core

Copan Walk-Away Specimen Processor™ is a truly revolutionary instrument with more than ten years of continuous evolution. **WASP® provides a comprehensive and modular system, encompassing all aspects of automated specimen processing** as plate planting and streaking, microscope slide preparation, broth inoculation.



Advantages

- Increases the quality of streaking, minimizing human errors
- Ensures traceability through labeling and reading systems
- Reduces consumables, management, and environmental costs
- Modular and scalable, adapts to every workflow

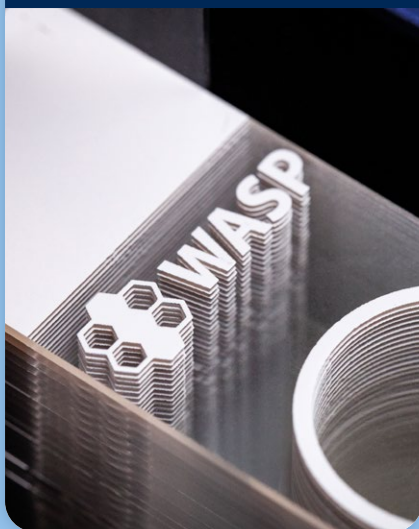
Tech-based quality

- **Sample entry conveyor**
Loads samples without interrupting the instrument or disrupting the lab workflow
- **Label printers**
Automatically print and apply barcodes to plates, broths, and microscope slides
- **Smart barcode reader**
Guarantees full traceability of every sample
- **Universal decapper ^[a]**
Decaps and recaps automatically sample tubes
- **Incinerator and hepa filter**
Avoids cross-contaminations and ensure a clean and safe environment
- **Onboard vortex**
Ensures the homogeneity of each sample
- **Inoculation verification camera**
Checks the sample presence in the loop
- **Plate carousel**
Holds up to 370 plates into nine different columns

WASP® modules

Slide prep evo™

Slide smear, barcode laser print, and slide dry out.



Broth module

Broth inoculation and automatic tube labeling.



Pipettor module

Customizable volume inoculations and multiple broth management.





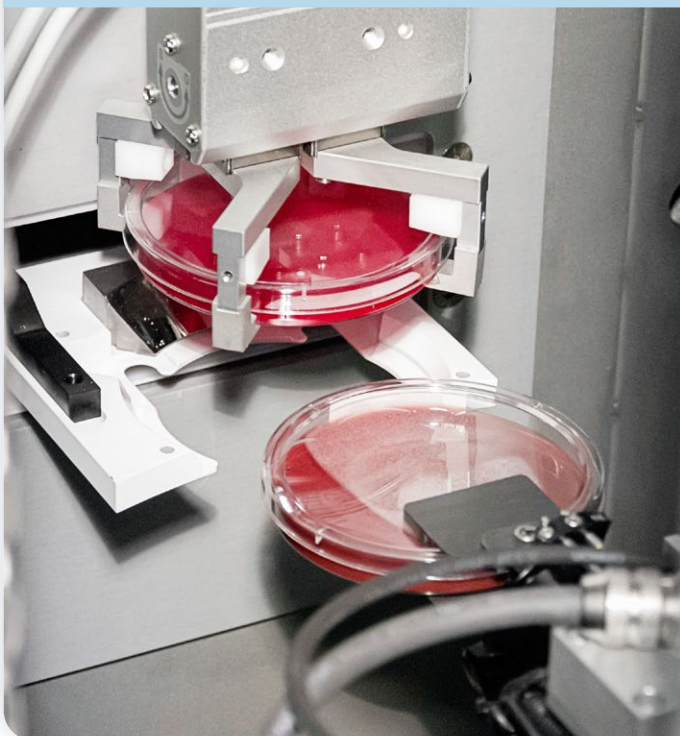
Digital microbiology



WASPLab®

Digital microbiology

WASPLab® is the natural evolution of WASP® redefining the state-of-the-art of FLA. **WASPLab® takes care of the incubation and imaging of the plates, bringing the lab into the world of Digital Bacteriology.** Before and during the incubation, the unique WASPLab® vision system acquires high-quality digital images on which a technologist can perform the reading phase.

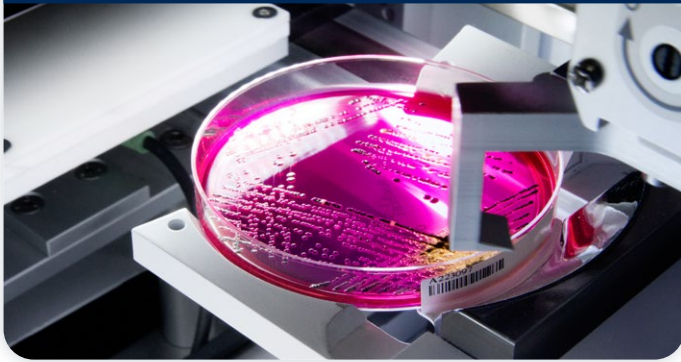


Advantages

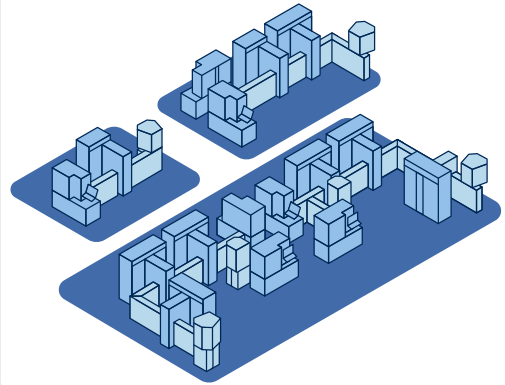
- Standardizes optimal incubation conditions for better and faster results⁵
- Improves lab productivity and quality through the automated specimen organization and easier recognition of bacteria
- Enhance reading performance, allowing lab technicians to make the most accurate workup-decisions
- Modular and scalable, adapts to every workflow

Image acquisition system ^[b]

A sophisticated lighting and camera system acquires the image of each plate clearly and accurately.

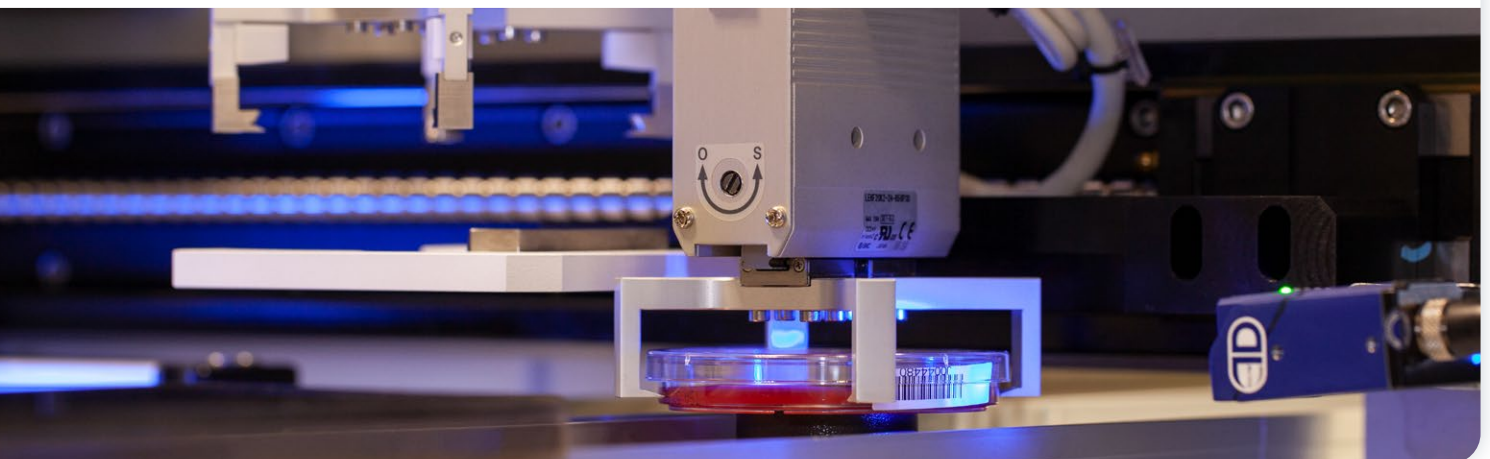


Modularity and scalability examples



Tech-based quality

- **Lightning system**
Multiple combinations of light conditions to maximize the image quality of different media plates
- **Robotic plate handlers**
Arrange upside down plates in individual spots for homogeneous incubation conditions and constant traceability
- **WebApp**
Designed to be the main access-point to WASPLab®, ensuring an easy and user-friendly interaction
- **Telecentric camera**
Acquires 48 Megapixel plates images at designated incubation times
- **Single and double incubators**
Incubate plates fitting the needs of laboratories of all sizes
- **O₂ and CO₂ atmosphere**
Wide range of controlled atmosphere settings for optimal bacterial growth
- **Workstation**
Improves manual plate management, screening, reading, and picking





Radian®

Automated AST



Radian®

Automated AST

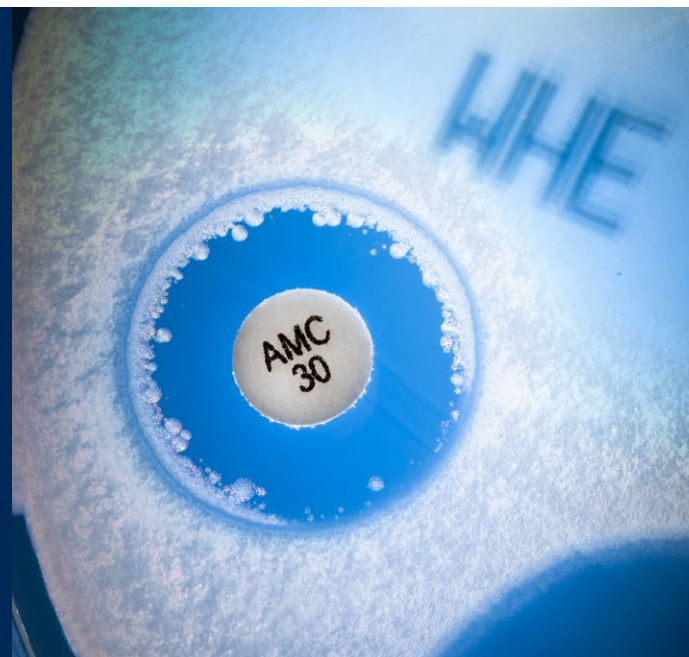
Radian® is the WASPLab® module **dedicated to the full automation and interpretation of Disk Diffusion Antibiotic Susceptibility Testing**. It is composed of two modules:

Radian® In-Line Carousel is the new WASPLab®'s module that takes care of disk dispensation, ensuring optimal integration and throughput.

Radian® Expert System leverages WASPLab®'s superior Digital Imaging and EUCAST rules to deliver an exceptionally accurate SIR interpretation.

Advantages

- Expresses the full potential of disk diffusion susceptibility testing
- Connecting Colibri™, WASP®, WASPLab®, and Radian®: a new workflow perfectly integrated
- Applies EUCAST standard and rapid rules from direct blood cultures^[d] automatically
- Enables early antibiotic therapy for the final benefit of patients



Radian® expert system

A flexible, customizable, and **user-friendly platform to interpret sensitive, intermediate, or resistant results.**

Being connected with the WASPLab® WebApp Halo Recognition image analysis algorithm and communicating with the lab LIS, Radian® Expert system is our fully integrated solution for AST automated interpretation in your lab.

- | | | |
|--|--|---|
| ○ Expert system hints
Keep everything in sight while working directly on the plate | ○ Halo-reading interface
With direct communication to the rules database | ○ Rule editor
Adapt or write from scratch your own interpretation rules |
|--|--|---|

Radian® in-Line Carousel

- **Parallel redirection line**
Boosts the integration of AST tasks into your daily routine
- **50 cartridge carousel**
Ensures maximum exibility in the antibiotic choice
- **Dual hepa filtering system**
An extra safety layer protecting from dangerous samples
- **Quality check**
Before the disk deposition, a dedicated vision system assures the ATB disk removal from the cartridge and the congruency between the disk and the selected protocol.



Located on the conveyor between WASP® and WASPLab® first incubator, **Radian® In-Line Carousel receives plates dedicated to AST disk dispensing on a parallel conveyor without compromising the throughput of WASPLab®.**

Radian® In-Line Carousel allows high disk dispensing flexibility thanks to its 50 positions ATB wheel and its 1 to 8 disk deposit protocols, assuring high quality and standards by cartridge ATB disk removal check and ATB acronyms control.



Rapid system advantages⁶

A fast time to result is crucial in the treatment of critical patients. We conceived a rapid direct AST (4h) compliant with the new EUCAST protocols and available on Radian® for blood cultures^[d]. The simultaneous application of Rapid Rules to multiple types of samples will be available soon.



PhenoMATRIX®

Microbiology brain



PhenoMATRIX®

Microbiology brain

PhenoMATRIX® uses artificial intelligence combined with clinical information from the LIS system to automatically read, interpret, and segregate bacterial cultures with the click of a button. Adding PhenoMATRIX® suite of algorithms to WASPLab® automation system eases the interpretation of patient results and gives microbiology labs the ability to shorten their time to results^{7,8}.



Advantages

- Breaks down the plate's key features thanks to its advanced digital image analysis algorithms
- Accelerates your interpretation through a clear plate visualization
- Custom expert rules for a tailored solution on your laboratory standards
- Sorts your plates images according to your rules and LIS data

Tech-based quality

Complete set results

PhenoMATRIX® **directly sorts all images based on the lab custom rules**, combining patient demographic data, clinical results, and the output of image analysis algorithms. The sorted images are subjected to the technologist for final validation.

- **Custom filters**
Groups plates in a folder-style interface, based on the laboratory rules
- **Results workup**
Summarizes all the plate results: negativity, isolate, colony count, and workup
- **One- click result release ^[c]**
All the results sorted using the custom filters are sent to LIS with a single click

PhenoMATRIX™ TAG

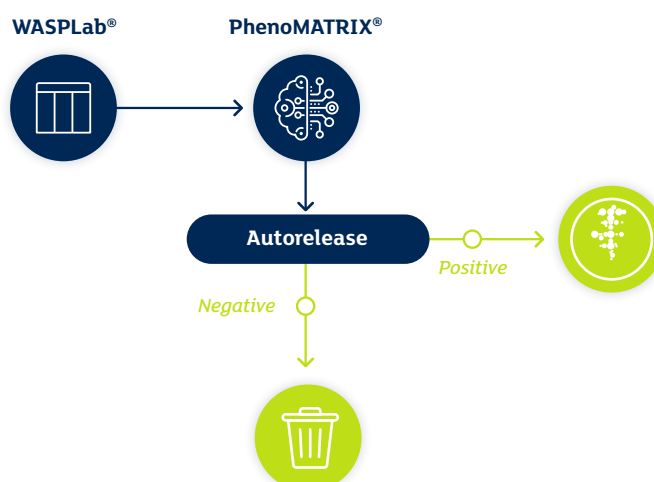
Understanding the colonies' coordinates and morphology, **PhenoMATRIX® TAG assigns the proper workup for each colony, according to your rules^[e]**. PhenoMATRIX® TAG consequently communicates to Colibr™ to pick the most appropriate ones for each specific task.



Autorelease concept ^[d]

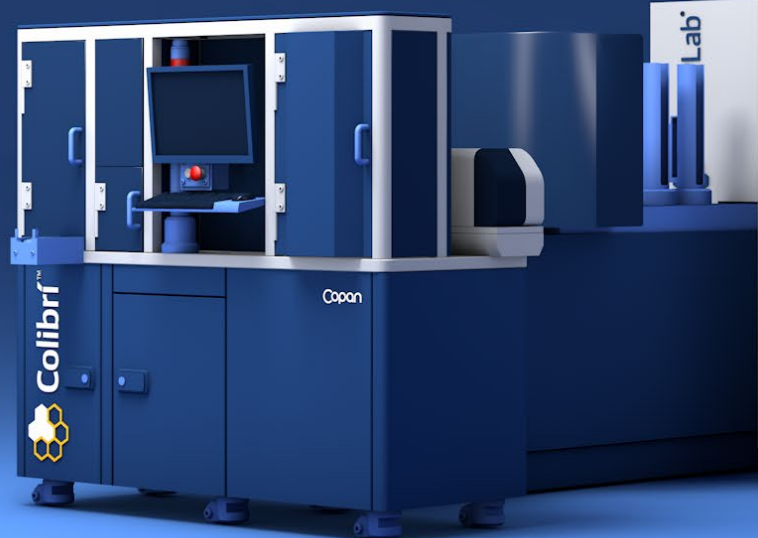
PhenoMATRIX® PLUS will automatically send all negative results to the LIS, discarding media plates without microbiologist validation.

This will drastically decrease the hands-on time for negatives and speed up the time-to-result for patients.





Precision microbiology



Colibrí™

Precision microbiology

Colibrí™ is a microbiology system that **automatically picks colonies previously selected by PhenoMATRIX® TAG or by an operator on the WASPLab® reading station.**

The instrument spots targets for microbial identification through MALDI-TOF technology and prepares microbial suspensions for Antibiotic Susceptibility Testing (AST).

Advantages

- Maximizes the focus on higher-profile tasks
- Ensures picking accuracy thanks to synchronized vision systems
- Integrates data with IVD analyzers for seamless traceability ^[a]



colony
picking



target
spotting



Formic acid
matrix deposition



isolate
data



colony
picking



McFarland
suspension tube



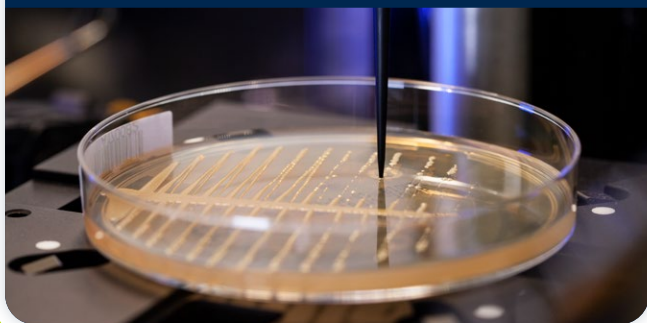
turbidity
check



AST tube
preparation

Direct Connection

Colibrí™ can function as a stand-alone device or be physically connected to WASPLab®, facilitating the automated routing of tagged plates for colony picking.



Radian® compatible

Automated colony picking by Colibrí™ is compatible with McFarland suspension tube preparation prior to Automated Susceptibility testing performed by Radian®.



Tech-based quality

◦ **Robotic pipettor**

Handles both colony picking and liquids transfer with extreme precision ^[a]

◦ **Containers table**

Holds up to sixteen target McFarland suspension tubes and AST tubes for the preparation of the microbial suspension ^[a]

◦ **Nephelometer**

Checks the turbidity of the microbial suspension to guarantee maximum precision and standardization

◦ **Printer and barcode system**

Automatically labels tubes and purity plates for traceability and label reconciliation

◦ **Vision system**

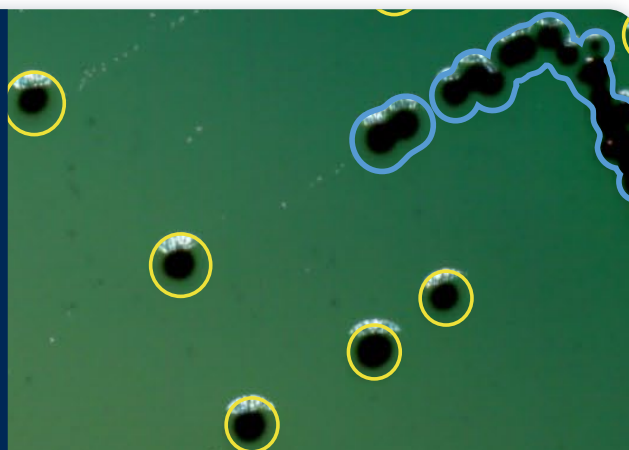
Controls the tip alignment and retrieves the colony coordinates from WASPLab®, matching them for accurate picking

◦ **Loading and unloading carousel**

Loads and unloads plates through seven configurable stackers

Direct communication with WASPLab® and PhenoMATRIX® TAG

WASPLab® WebApp highlights the isolated colonies and the aggregated ones with different colors. PhenoMATRIX® TAG defines the optimal colonies to be picked, communicating the coordinates with Colibrí™ for a reliable picking.





Moving microbiology



Wasp-flo™

Moving microbiology

WASP-FLO™ is the module we developed **for microbiology laboratories with multiple WASP® or WASPLab® lines, to streamline sample loading and unloading.** WASP-FLO™ automatically sorts samples^[a], drives them to the appropriate WASP®, and batches the tubes in output racks after processing.

Advantages

- Optimizes sample management through random access and evaluation of the workload in real time
- Sorts and route in and out samples to increase the lab's efficiency
- Boosts your lab's productivity to high-throughput levels
- Thanks to the complete data management system, it keeps under control the full path of each sample.



Tech-based quality

- **Dual SCARA robots**

The Pick-and-Place robots sort tubes in RFID-driven pallets and unload completed samples onto dedicated racks

- **Hopper module**

Contains up to 600 samples per batch and sorts them individually

- **Completed specimen output**

Hosts 792 samples divided into eight output racks

- **Manual specimen loading**

Includes four columns composed of eleven RFID pallets

- **Graphical user interface**

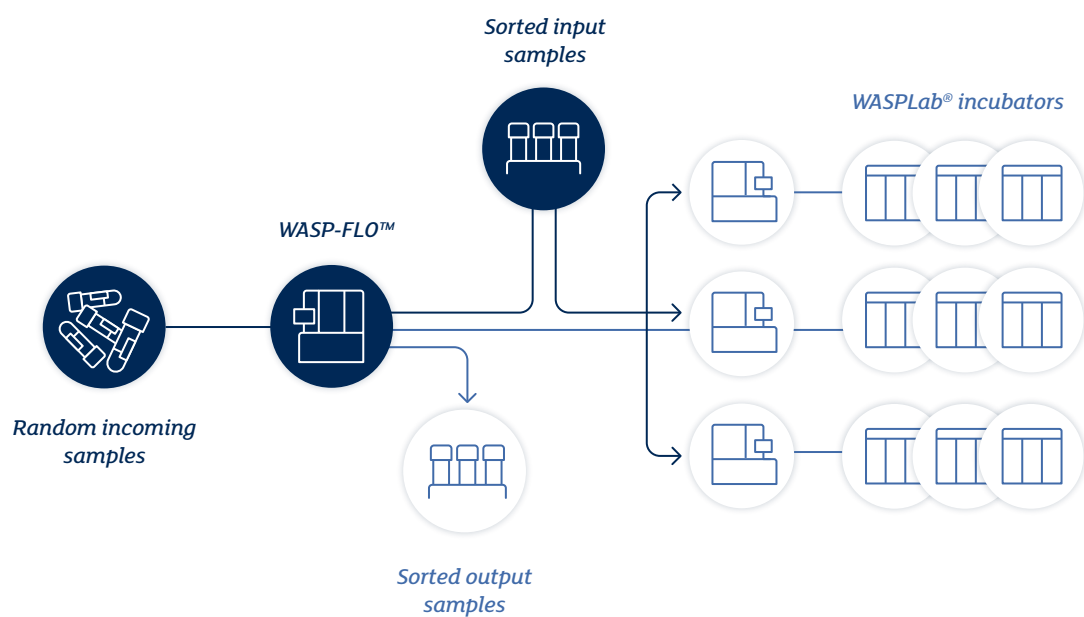
Backup loading system for special containers

- **RFID pallet stacker**

Manages overall system data



Workflow example





MicroHub®

Microbiology string



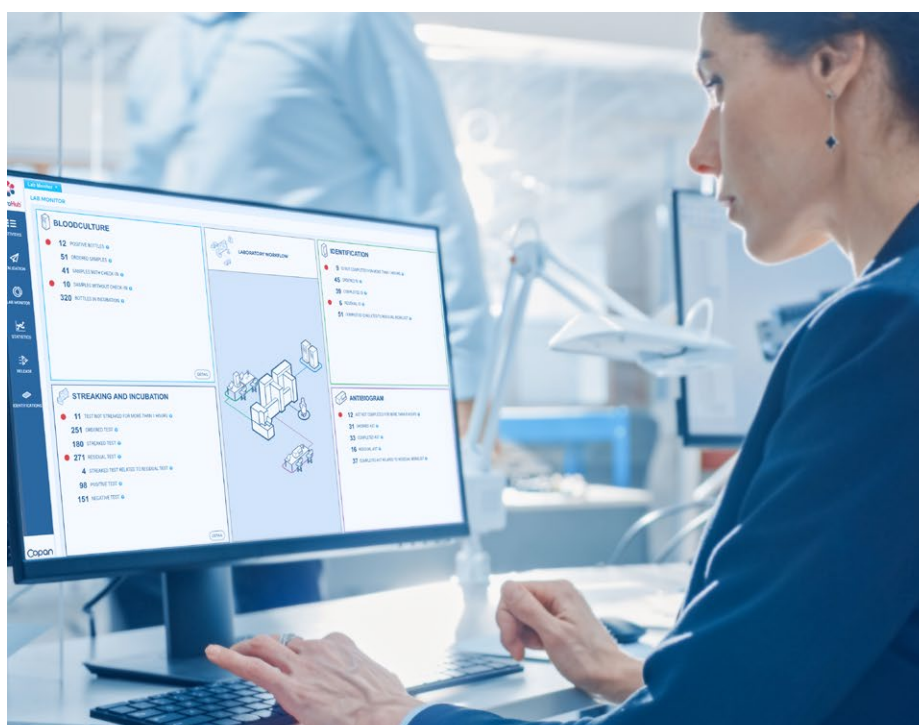
MicroHub®

Microbiology string

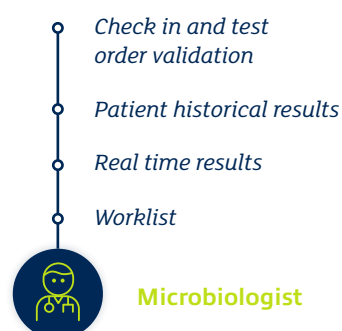
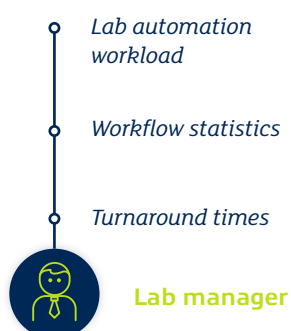
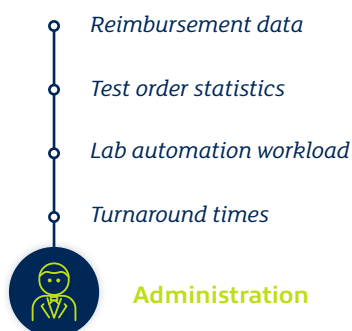
Connecting WASPLab® to LIS and other instruments, MicroHub® represents the next step into a new way of managing lab data.^[d] Think of it as **middleware, handling patient data, test orders, results, and the entire lab workload in real-time**. MicroHub® is the perfect tool to centralize the final validation step and keep lab's productivity under control.

Advantages

- Apply custom laboratory rules for the automatic result validation
- Includes communication drivers for all laboratory platforms
- Enhances the validation process boosting data accessibility and integrating mass-operation features



Focus on your needs

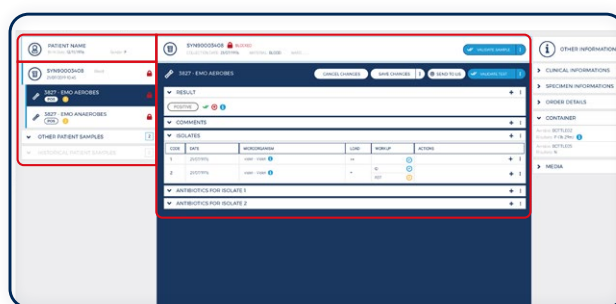


Tech-based quality

MicroHub® is your patient-centric interface.

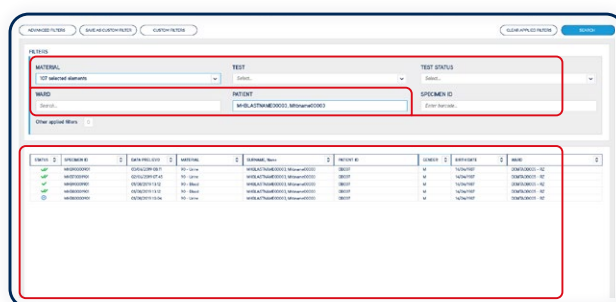
In the Validation Page, you can access all the patient data to validate results, keep track of ongoing processes, and avoid expensive repetitions.

- **Patient demographics**
- **Ongoing, completed, and historical process**
- **Validation hub**



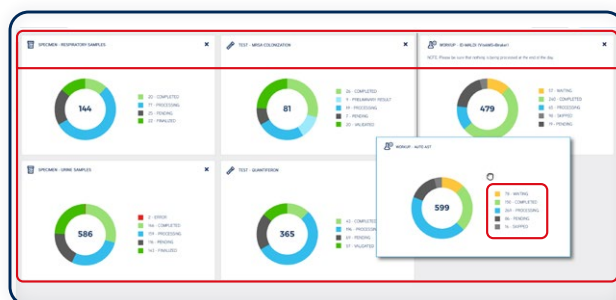
The Advanced Search page is the ideal representation of MicroHub®'s flexibility. Depending on your goal and access rights, you land to the data you are interested in just a few clicks.

- **Patient-related filters**
- **Test-related filters**
- **Filtered worklist**



The Activities Management page lets you **track the laboratory's real-time performance and workload**, highlighting data you choose as indicators of your priorities.

- **Customizable dashboard**
- **Data categorization**
- **Status and workload**



Scientific references

All the independent studies we cited in this product focus are listed here.

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8. Tam T. Van, Kenneth Mata, Jennifer Dien Bard. Automated Detection of Streptococcus pyogenes Pharyngitis by Use of Colorex Strep A CHROMagar and WASPLab Artificial Intelligence Chromogenic Detection Module Software. *Journal of Clinical Microbiology*, 2019

Notes

Please consult Copan for the availability of these products in your Country

- [a]. To grant the reliability of results and allow the instruments safe and correct functioning, spare parts and technical support must be provided by Copan (or its authorized distributors). Any third party's containers, culture plates and consumables to be used on the instruments must be approved in writing by Copan. Limitations may apply: Please refer to Copan's official technical documentation.
- [b]. The WASPLab® imaging system is patented (AU2014259028B2, JP6460421B2, IT1417398) and patent pending (EP2989470A1, US2016083686A1).
- [c]. Subject to final reporting performed by qualified personnel.
- [d]. Product not yet commercially available.
- [e]. Plate compatibility and strain compatibility are in continuous development. Please contact Copan for the latest updates.
to which the systems described in this brochure contribute



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