How Liquid Based Microbiology can change the workflow in the Microbiology laboratories

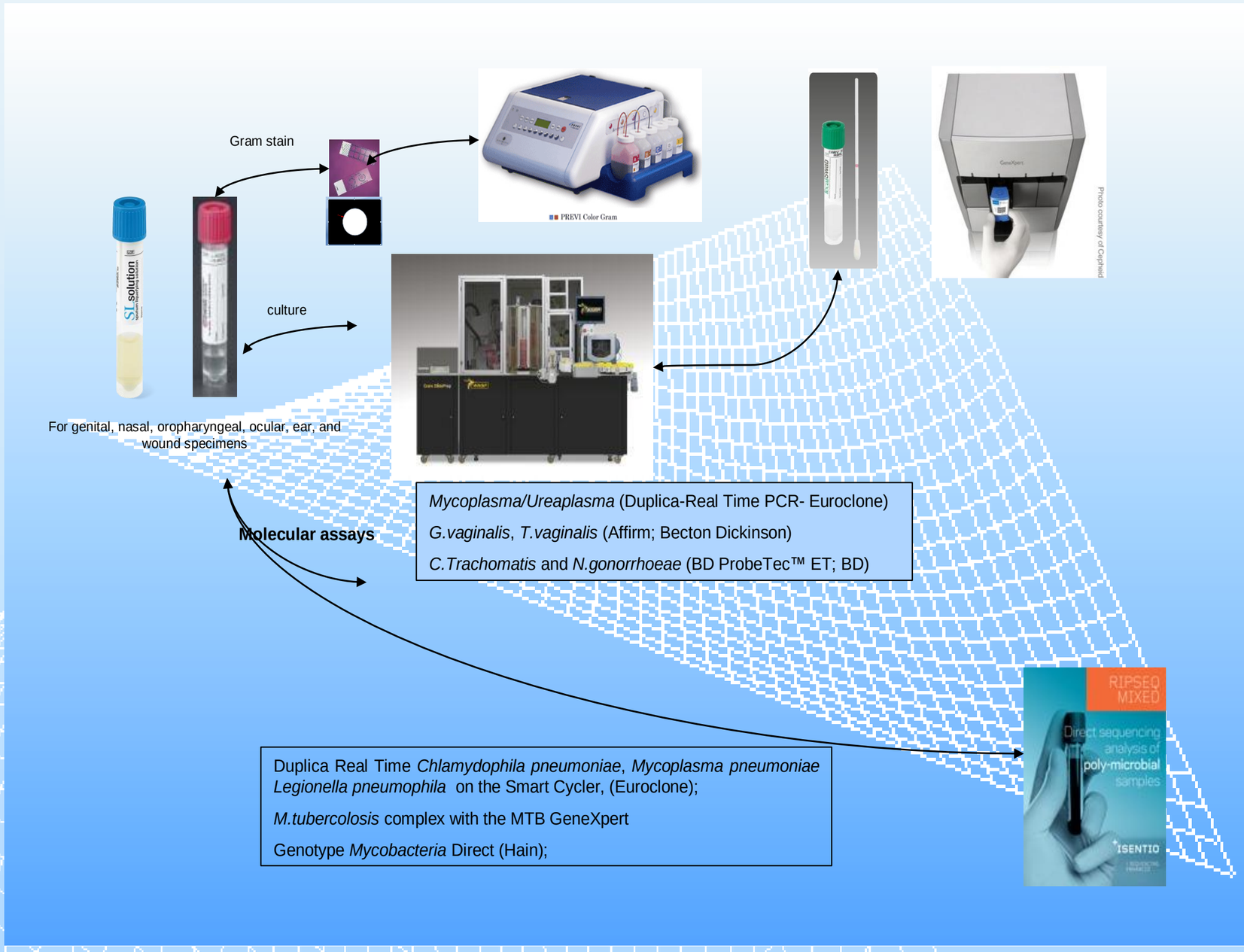
Carla Fontana, Marco Favaro, Cartesio Favalli

1 Dip. Medicina Sper. e Sc. Biochimiche – Università Tor Vergata – Via Montepellier 1 00133 Roma
2 Lab Microbiologia - Policlinico Tor Vergata – V.le Oxford 81 - 00133 Roma

ECCMID 2012 LONDON P1648

Background

The WASP automation and Liquid based Microbiology (LBM) concept have been introduced in the microbiology laboratories by the advent of the ESwab system.
From the development of the ESwab tube collection system to date many other devices have been added to the list, so that presently there are no or very few clinical specimens in each branch of the microbiology laboratory that cannot be processed on the WASP and has been improved by the introduction of LBM devices.
In our laboratory we have adopted the LBM system since 2008 and currently are used for a variety of tests, including culture, Gram and molecular.



Results

Our three years experience and extensive utilization of LBM devices demonstrate that a laboratory operating in manual-mode can automate several processes, by changing specimens collection from traditional Transystems to liquid phase ones.

The same specimen collected or treated with such devices can be used for Gram stain, culture, antigen/toxins detection and numerous molecular assays, without affecting the sensitivity, but improving the work flow by reducing processing time, like in the case of direct sequencing [1-4].

Very interesting comparative results were obtained using Mixed RipSeq (Isentio) versus culture in the wound swabs.

The mixed sequencing applied directly on the Liquid Amies from ESwab has enabled us to detect both Gram negative (*P.mirabilis*, *A.baumannii*, *B.melitensis*),

Gram-positive bacteria (*S. aureus,* in a fragment of the aortic valve transported in E-swab) and anaerobic (*Prevotella disiens*) lost with the traditional culture.

Methods

In this study we have used ESwab, Fecalswab and SL-solution (Copan Italia, Brescia). ESwab is used for the microbiological specimen usually collected with a swab (like genital, nasal, oropharyngeal, ocular, ear, and wound specimens); Fecal swab is for gastrointestinal sample collection (stool or rectal swab). Both systems are used to perform traditional culture (either manual or automated using the WASP system), Gram stain smear preparation, direct detection of bacterial antigen and toxins and molecular assays. SL-Solution, a new device generation, used to pre-treat mucous rich specimens for gram smear, culture and molecular test for the detection of many pathogens. Samples in ESwab medium are used to detect pathogens using the following assays:

Direct sequencing with Rip Seq Mixed (Isentio); Duplicate Real Time CP, MP, LP on the Smart Cycler, (Euroclone); *M.tubercolosis* complex with the MTB GeneXpert and GeneXpert *C.difficile* (Cepheid); MOTT (Mycobacteria other than tuberculosis) with the Genotype *Mycobacteria* Direct (Hain); BD CT/GC with ProbeTec™, bacteria vaginosis with the Affirm™ VPIII; Duplica Real Time PRC for *Mycoplasma genitalium* and *Ureaplasma urealyticum* (Euroclone).

Conclusions

The WASP automation has improved the laboratory workflow, by re-allocating staff to specialized section of the laboratory. The Copan LBM device family has allowed us to optimize the workflow in the laboratory especially for its suitability for a variety of testing methods like Gram stain smear preparation, culture, with manual and automated inoculation methods, and for molecular assays.
LBM, for culturing as well for molecular biology, allows clinical specimens optimization with some important advantages: 1) cost reduction (due to the lesser number of different devices used) time saving for medical or nursing staff (less confusion in collection device selection and less samples being collected), time saving for laboratory staff (less samples to access and handle for individual investigations), and last but not the least “patient comfort improvement” (multiple sample collection can be avoided). A unique collection device for several “investigations” also means to guarantee quality due to the uniformity of the sample and standardization of procedures. Finally, LBM devices processed by an automated instrument allow a greater traceability of sample and processes.

References

1-**Fontana C**, Favaro M, Limongi D, Pivonkova J, Favalli C. *BMC Res Notes*. 2009 Dec 10;2:244. Comparison of the eSwab collection and transportation system to an amies gel transystem for Gram stain of clinical specimens.
2-C.**Fontana**, M. Favaro, D. Limongi, J. Pivonkova,C.Favalli Gram-stain by a new specimen collection system: ESwab ECCMID 16-19 May Helsinky
3-M. Favaro M. Pellicioni, **C. Fontana**. P1680 SL-Solution for pre-treatment of mucus-rich respiratory specimens for culture and molecular assays. 7-10 May 2011. ECCMID Milan.
4-A. Altieri M.C. Bossa, F. Capalbo, L. Di Traglia, **C. Fontana**. P1679 Comparison of the Copan fecal swab to dry containers for collection and transportation of stool samples for detection of bacteria causing gastrointestinal infections. 7-10 May 2011. ECCMID Milan.

Author Carla Fontana: carla.fontana@uniroma2.it