BioSeeq Portable Veterinary Diagnostics Laboratory

A field deployable Rapid Testing and Instant Reporting system

Carmelo Volpe Ph.D.
Director of global Sales & Marketing
Smiths Detection has true global presence

Global HQ, Watford UK

CENTRAL TEAM:
45 (Technology/Global IT/ Business Development/Projects/Admin)

COMPETENCE CENTRES:
Manufacturing /R&D
Wiesbaden: Imaging; explosives
Paris: Hi-energy X-ray
Watford: Chem/bio/diagnostics
Edgewood: Chem/bio/integration
Toronto: Explosives
Danbury: FT-IR

Manufacturing:
St Petersburg: X-ray
Alcoa: X-ray

R&D:
Pasadena: chemical
Boston: bio
Newport: sensor management
Cork: mm-wave

Total employees 2400 globally, including > 500 R & D engineers
Rapid on-site disease diagnosis for vets
The features of such a system

1. Simple sample preparation system for processing a wide range of samples in the field

2. Easy to use, robust and reliable PCR based system for pre-clinical/clinical diagnosis of a range of viral, bacterial and fungal pathogens

3. A diagnostics capability that is informative through disease assay panels (highly multiplexed PCR)

4. Can integrate in to outbreak management/targeted surveillance processes to give real time tracking and response

Golden rule - Any sample, any test, by anyone, anytime, anywhere
The evolution of sample preparation

Manual Extraction and PCR set up

Automated Extraction and/or PCR set up

Automated Extraction and PCR set up/analysis

10 years ago

5 years ago

Now
Sample preparation in the field

- Purifies DNA or RNA from a wide range of sample types (Blood, Faecal, Nasal Swabs, Vesicular Tissue and Milk)
- Completely sealed unit that will isolate & contain any bio hazardous material and can be immersed for decontamination
- Simple, completely automated sample preparation and PCR/rtPCR, driven by the BioSeeq instrument
- All enzymes and additives as temperature stable beads
- Communicates with BioSeeq to download assay formats and conditions for latest assays
Portable PCR instrument

Feature 2

- 4 colours for increased multiplexing
- Active Peltier cooling for strain level discrimination
- 5 independent analysis stations
- Automated sample preparation and analysis
- Rechargeable battery for field use
- Remote Wireless Communications
- Touch screen control
- GPS for integrated data analysis

- Sample to answer in as little as 120 minutes, depending on assay and sample type
Any sample ...

Example sample types
Blood – ASF, FMD
Vesicular tissue - FMD
Swabs – Avian Influenza

Benefits
Only one SPU required:
Reduces stock holding requirement for the user
Improves cost benefits
Complete flexibility
any test ...

Selected reagent pack is added to SPU to create complete test

Benefits
Only one assay format required:
Rapid response to changing threats
No need for training on each assay
Easy introduction of new assays
by anyone.

Benefits

- Allows tests to be run by non-PCR experts
- Facilitates introduction of new tests
- Prevents running assays that are out of date
Decontamination

The instrument can be immersed in Virkon for disinfection (Virkon S tablets at 1% w/v)
Informative assays

Feature 3

Pan-FMD LATE-PCR Assay

- Two Fluorescent Colours
- 2 Different Probes in One Multiplex Reaction
- 2 Primer Pairs in Multiplex (including positive control)
- 6 oligonucleotides in 1 reaction
- Read at End-Point at 55°C
- 1 Tube but 2 different answers

Identifies

All 7 serotypes of FMDV
Not FMDV
Verification of Pan-FMD assay on IAH isolates

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<th>FMDV Serotype</th>
<th># of isolates tested</th>
<th>Positives Results by:</th>
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<td>TOTAL</td>
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<table>
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<tr>
<th>NON-FMDV negative control isolates: Tests for false positives</th>
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<td>SVDV</td>
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<tr>
<td>VSV / VESV</td>
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<tr>
<td>ERAV</td>
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<tr>
<td>Uninfected epithelium / serum</td>
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<td>TOTAL</td>
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</table>

Assays run on Stratgene instrument
Informative assays
Feature 3

Poultry Notifiable LATE-PCR Assay Panel

- Four Fluorescent Colours

- Eight Different Probes in One Multiplex Reaction

- Seven Primer Pairs in Multiplex (including controls)

- 22 oligonucleotides in 1 reaction

- Read at End-Point at Temperatures 55°C and 35°C

- 1 Tube but 7 different answers

Identifies
Influenza A
H5N1 Not LPAI
H5N1 LPAI
H7 Not LPAI
H7 LPAI
Newcastle Disease
Negative for above
Rapid Testing and Reporting Systems

Feature 4
The power of integration - GIS

An example in Google Earth

From http://declanbutler.info/Flumaps1/avianflu.html
More information

On the WEB

www.smithsdetection.com/vet

By E-mail

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carmelo.volpe@smithsdetection.com