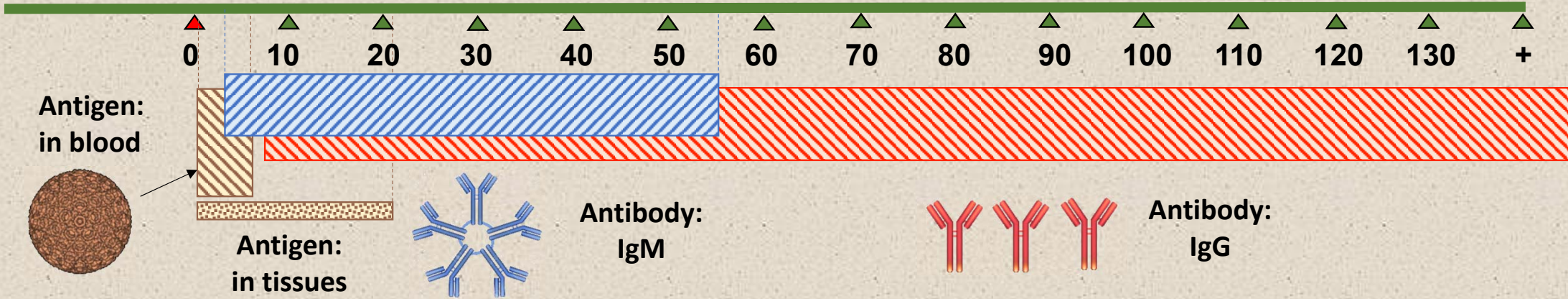
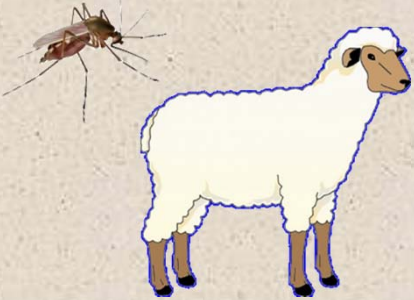
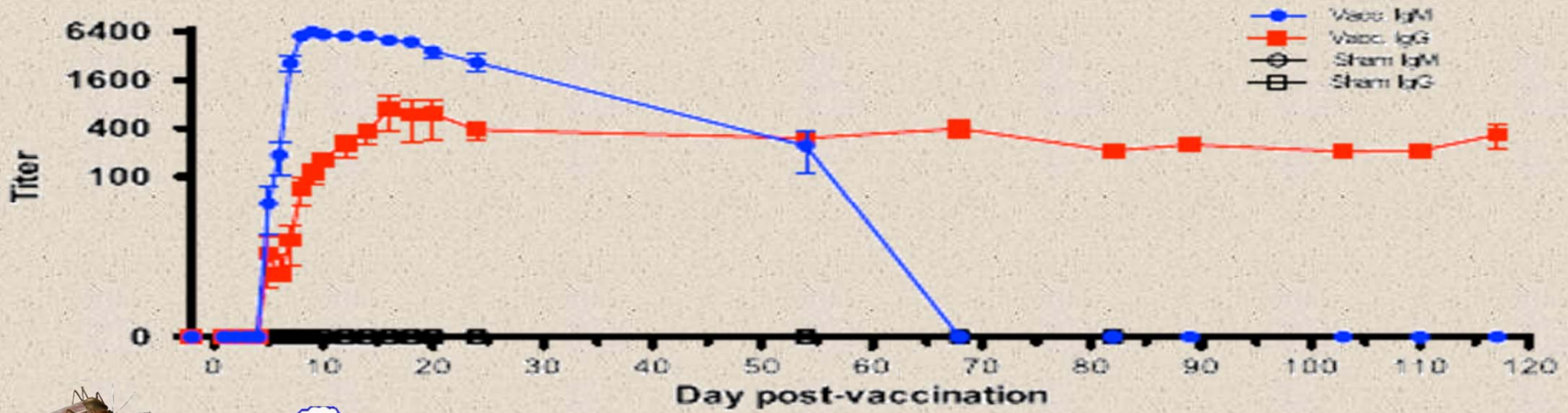


A practical perspective on current and new developments in Rift Valley fever diagnostics

Dr. Louis Maartens (BVSc MSc (Path))

21 April 2015 – 23 April 2015
Djibouti





Antigen detection

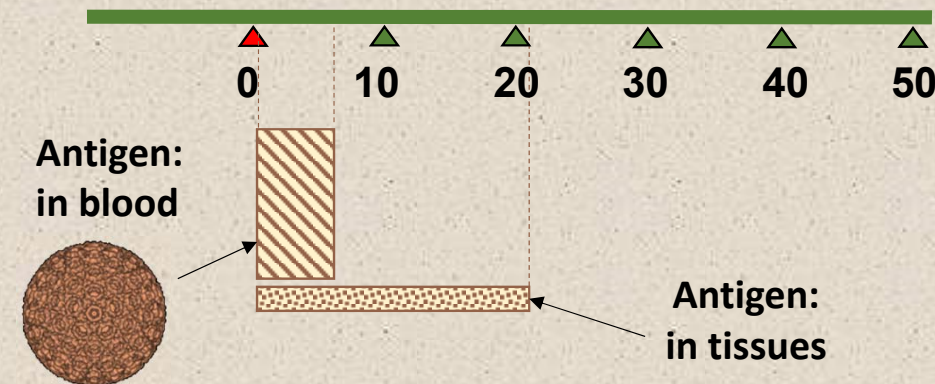
To confirm diagnosis during outbreak...

❖ **Ag detection in blood (mostly live animals)**

- **Time frame:** 2-5 days only (extreme: 16h to 12days)
- **Golden standard:** Virus isolation (Cells, mice I/C)
- **Routine test(s):**
 - RT-PCR, Real Time RT-PCR (S, M or L)
 - Ag-capturing ELISA

❖ **Ag detection in tissues (dead animals)**

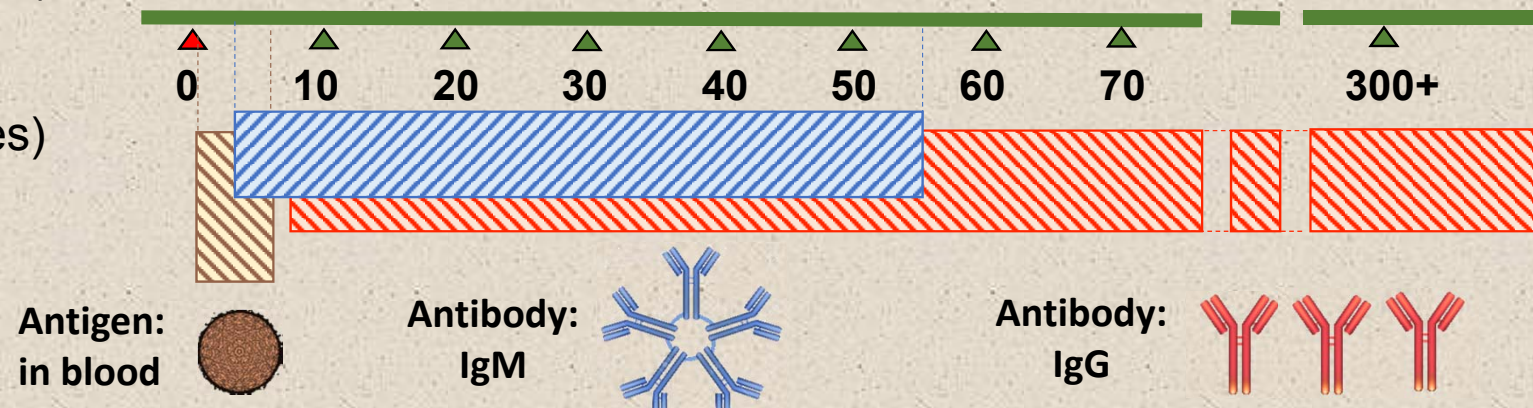
- **Time frame:** >5days (extreme 21days)
- **Additional assays:**
 - Immunopathology (IMP, IFA)



Antibody detection (IgM and IgG):

To detect any previous exposure (recent and older) to virus

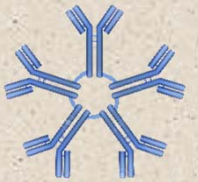
- **Time frame:** From ca. 5 days onwards (for life?)
- **Golden standard:** Virus neutralisation test (VNT), laborious, low throughput
- **Routine test(s):**
 - Formats (direct, competitive)
 - Ag: virus, rNP, rGn & rGc
 - Competitive (Multi-species)



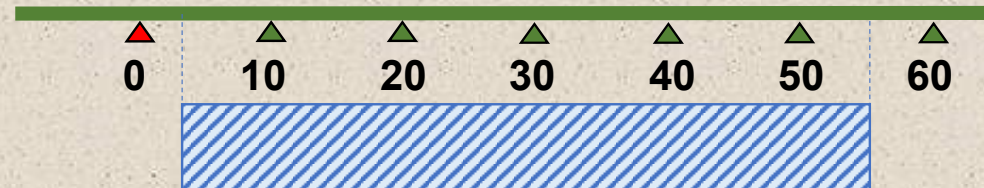
Antibody detection (IgM-specific):

To specifically detect recent infections...

- **Time frame:** ca. 5 to 50 days post exposure
- **Golden standard:** n/a
- **Routine test(s):**
 - IgM capturing ELISA (mu chain-capture ELISA)
 - species-specific



Antibody:
IgM



Antibody detection (IgG-specific):

To detect animals previously exposed to the virus...

- **Time frame:** From ca. 10 days onwards (for life?)

- **Golden standard:** n/a

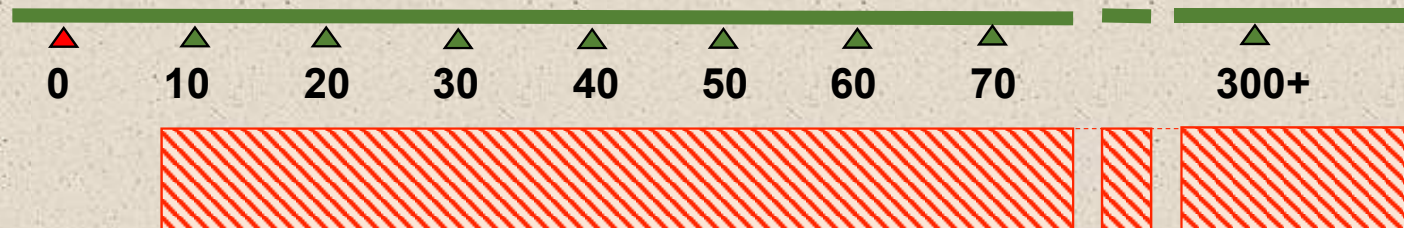
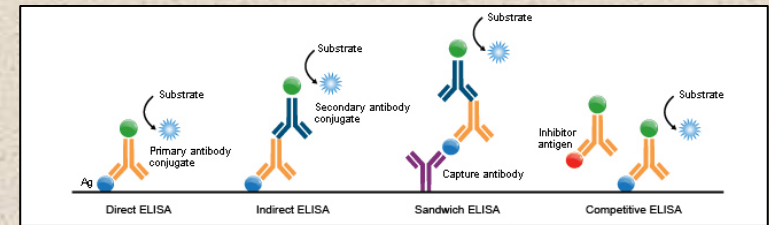
- **Routine test(s):**

▪ Indirect ELISA's

- Ag: Virus, rNP or rGn & rGc

- Species-specific

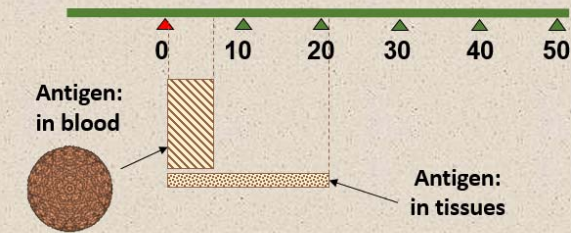
- **DIVA compatible (NSs)?**



Antibody: IgG

New developments in antigen detection

- Multiplex PCT primer targets on S, M and L (DIVA compatible)
- RT-PCR improvements (safety, sensitivity, speed, labour)
- *In situ* hybridization on tissues
- Antigen and nucleic acid detection on fluorescent microsphere micro-assay technology ([Luminex](#)). (DIVA compatible)
- [Microarrays](#)
- [Embedded biosensors](#)
- [Immuno-chromatographic lateral flow device](#) (pen side or point-of-care test)
- [LAMP technology](#) (less expensive gene amplification tool)

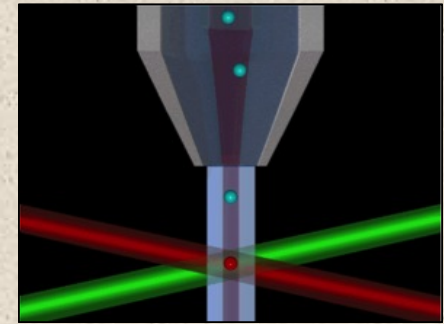


Refinement of existing tools

Multiplexing for syndromic testing

Rapid field test (pen side)

❖ New developments in antibody detection:

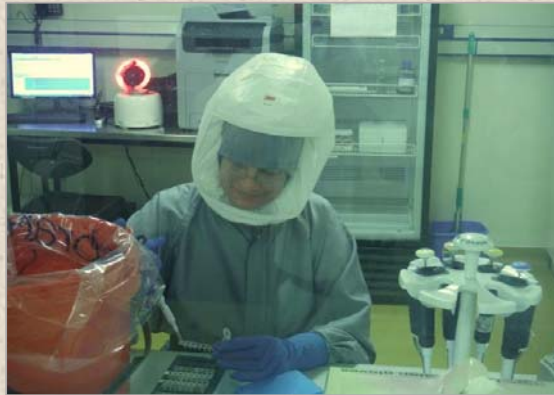


- ELISA improvements
(safety, speed, sensitivity, specificity, multispecies, etc.)
- DIVA test development (e.g. NSs)

Refinement of existing tools

- Microsphere microassay (Luminex) technology
(DIVA compatible)
- Microarrays (DIVA compatible)

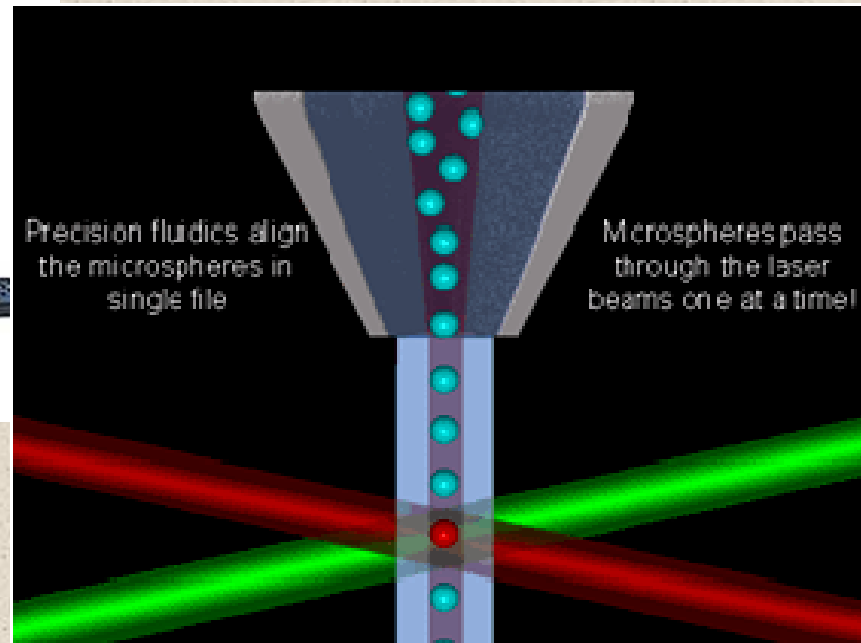
Multiplexing for syndromic testing



Thank you for your attention

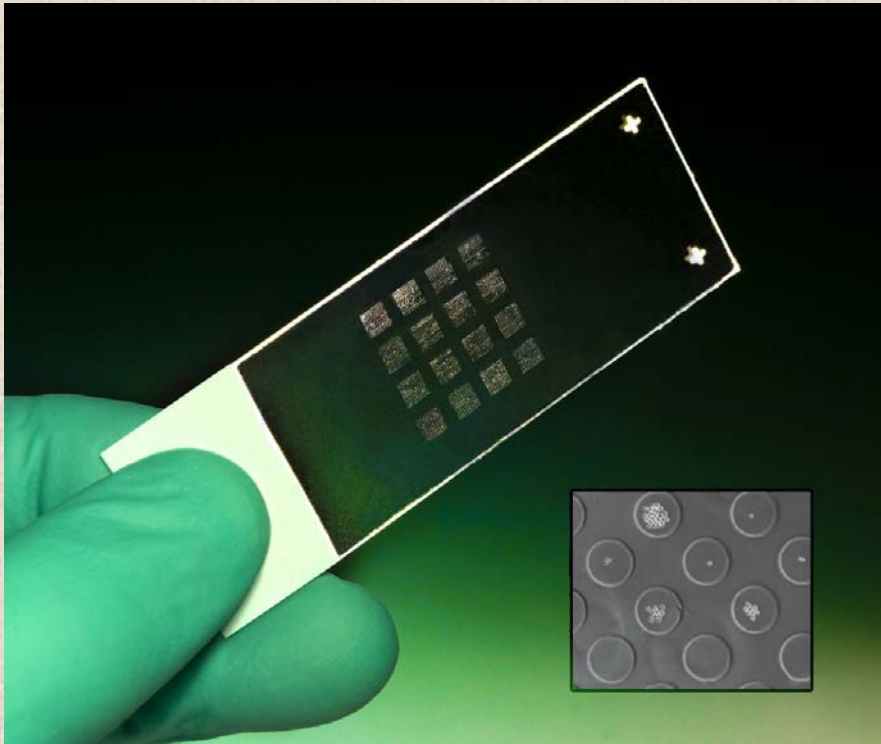


Fluorescent microsphere micro-assay technology (*Luminex*)



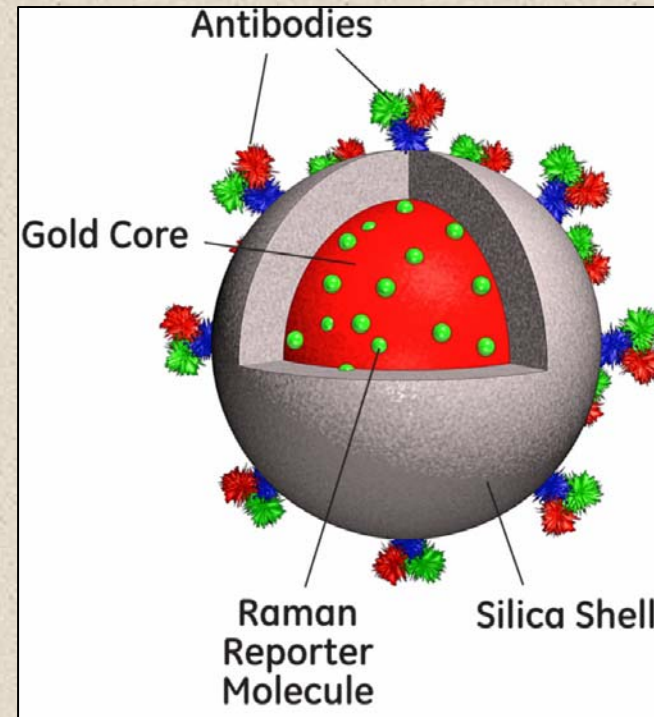
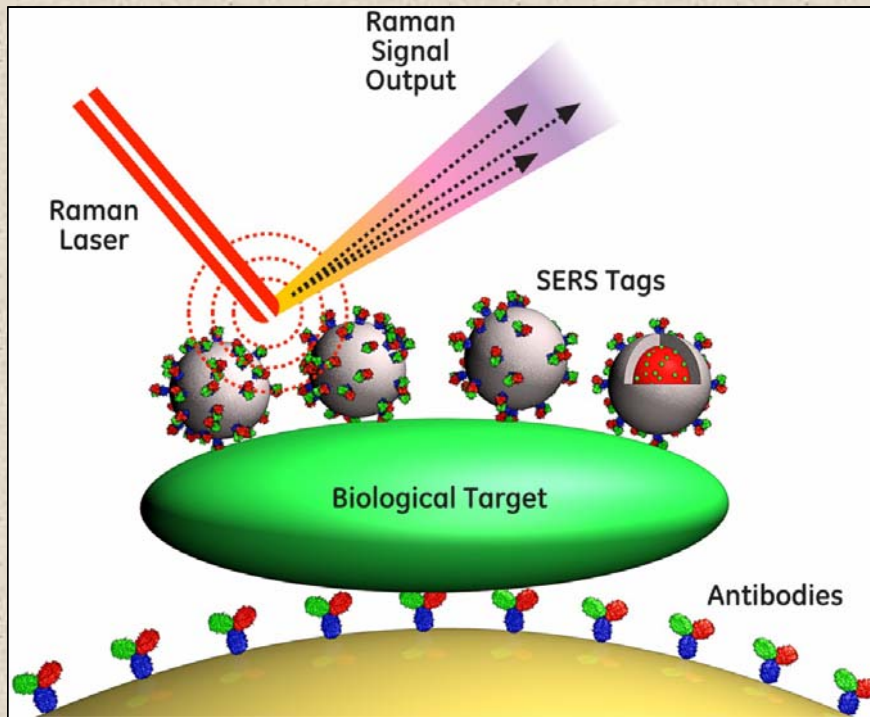
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Microarrays



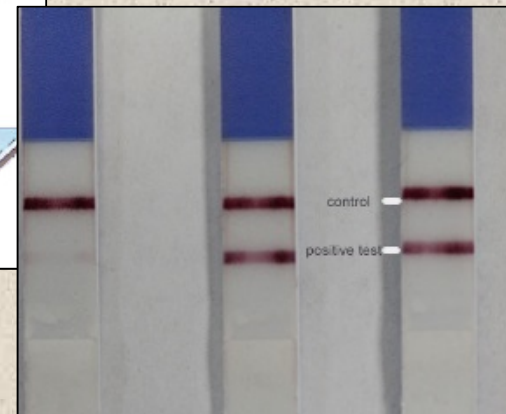
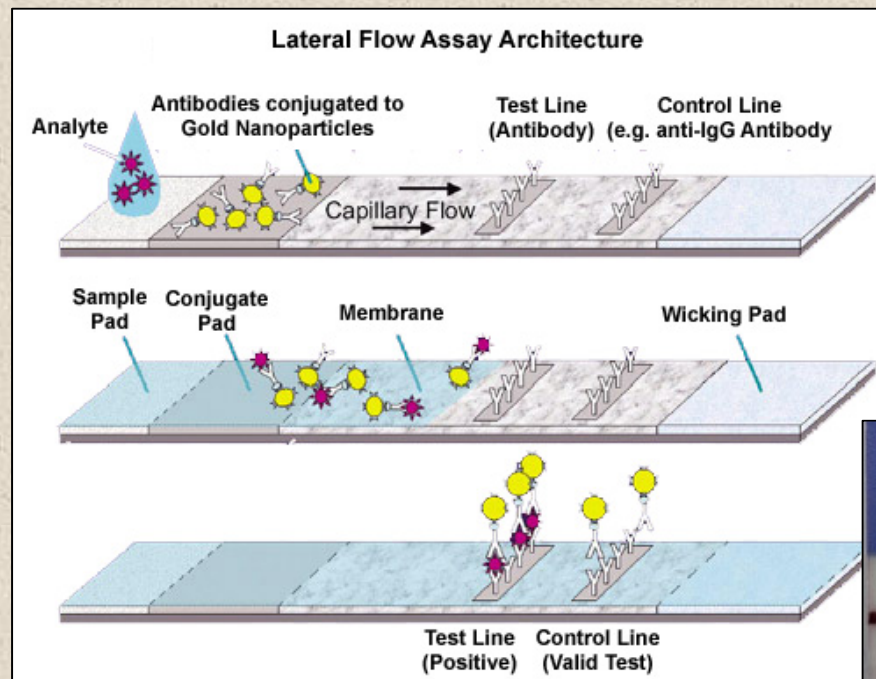
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Embedded biosensors



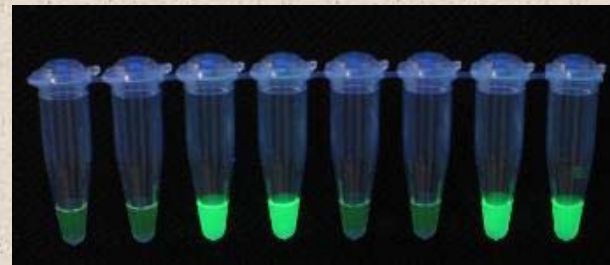
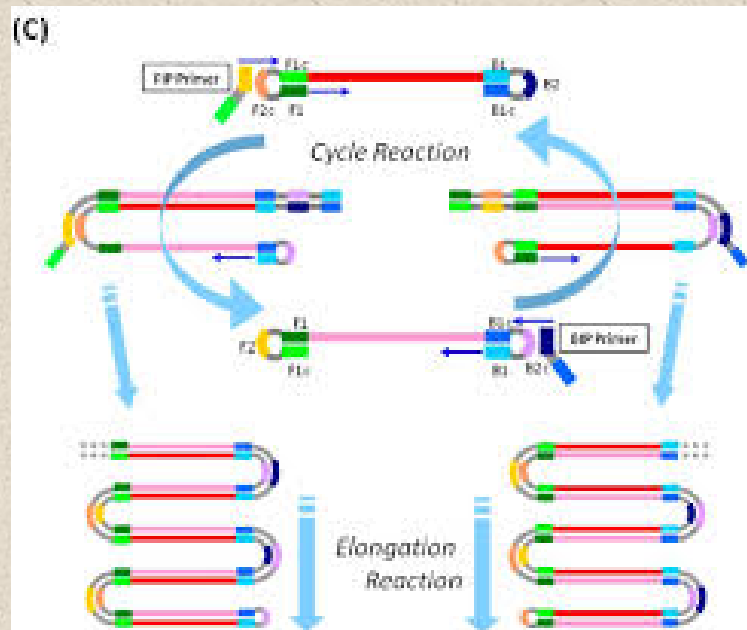
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Immuno-chromatographic lateral flow device



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Loop-mediated isothermal amplification



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