Symposium:

‘New Diagnostic Tools for Leprosy’
Current Diagnosis

- Test based on **Clinical signs**: skin lesions, skin smear, sensibility => no early detection

- Test based on **immunological responses**:
  1. **Ab-test**: mostly detect MB not PB
  2. **Lepromin skin test** = Cellular IR (not specific)
### ‘New Diagnostic Tools’

#### Programme 11 AM - 12.30 PM:

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<td>Identification of serological biomarkers of infection, disease progression and treatment efficacy for leprosy</td>
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<td>Antigen associations for the diagnosis of paucibacillary leprosy</td>
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New tests detecting Cellular & Humoral immunity against *M. leprae*

18th September 2013, Brussels
Test Development

- Develop easy-to-use field test for early detection of leprosy
- Based on detection of multiple Biomarkers (CMI & HMI)
- Applicable in field setting
UCP-based assay for diagnostics

- UCP = Up-Converting Phosphor
- UCP reporter particles contain a crystal structure
- The structure contains rare earth metals that absorb IR light and emit visible photons
- Applications in diagnostics for HIV, TB, Hepatitis C
Luminescence Process in an Up-Converting Phosphor

M = Host Matrix     Er = Erbium     Yb = Ytterbium

Upconversion process:

Excitation → Energy Transfer → Emission

M = Host Matrix     Er = Erbium     Yb = Ytterbium
UCP-based Assays

Advantages

- Low background (rare earth metals)
- UCP compounds are chemically stable (long-shelf life)
- Do not bleach (transport without cold chain, allowing re-analysis in reference lab)
- Simultaneous detection of multiple biomarkers in 1 sample
ELISA vs UCP-LF

correlation UCP vs ELISA for IFN-γ

ELISA IFN-γ (pg/ml)
UCP IFN-γ (FU)

10^{-1} 10^{0} 10^{1} 10^{2} 10^{3} 10^{4} 10^{5}

0.0 0.5 1.0 1.5 2.0

ELISA IFN-γ (pg/ml)
UCP IFN-γ (FU)

correlation UCP vs ELISA for IL10

ELISA IL-10 (pg/ml)
UCP IL-10 (FU)

10^{-1} 10^{0} 10^{1} 10^{2} 10^{3} 10^{4}
UCP-LF Diagnostic Test

Strip 1  Strip 2

Samples

Flow

Value

Strip 1

Strip 2

Strip 1

Strip 2
UCP-LF Summary:

- A field-friendly, LF is developed for **cellular** (cytokines) and **humoral** (PGL-I) IR to *M. leprae*.
- Th1 (IFN-γ) & Th2 cytokines (IL-10)
- More cytokines under development
Contributions

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