

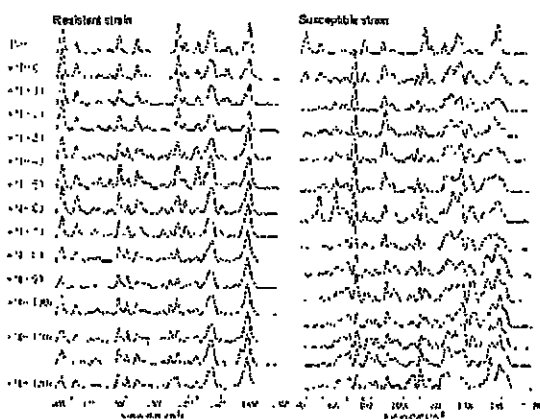
**PS-101205-13 Monitoring anti-tuberculosis drug induced chemical changes in *M. tuberculosis* by SERS**

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**Aim:** To monitor antibiotic-induced chemical changes of *Mycobacterium tuberculosis* by surface-enhanced Raman spectroscopy (SERS) and to demonstrate the feasibility of using such a high-speed nondestructive optical technique for detecting the differences between drug-susceptible and drug-resistant strains.

**Methods:** Substrates with extremely large and uniform enhancing power are exploited for measuring the vibrational spectra of molecules on the cell-wall of *M. tuberculosis* by SERS. Thanks to the sensitivity of the method, the spectrum of single or few bacteria can be recorded in a few seconds, allowing real time monitoring of chemical changes on bacteria after being exposed to antibiotics. Based on the characteristic differences in the changes, drug susceptibility of *M. tuberculosis* can be identified. Pan-susceptible and mono-drug (isoniazid, rifampicin, ethambutol, or pyrazinamide) resistant *M. tuberculosis* were analyzed.

**Results:** The SERS spectra of a pan-susceptible *M. tuberculosis* strain exhibits dramatic changes in a few tens of minute after treating with isoniazid (INH), as shown in the following example (Figure). In contrast, the SERS spectra of an INH-resistant strain show relatively minor and stable changes. Two robust peaks (400 cm<sup>-1</sup> and 525 cm<sup>-1</sup>) for INH resistant, while one (725 cm<sup>-1</sup>) for INH susceptible *M. tuberculosis* were identified.



**Conclusion:** The SERS-based detection platform with single bacterium sensitivity opens unprecedented op-

portunities for drug susceptibility testing of *M. tuberculosis* and assessing the efficacy of new drugs for tuberculosis.

**PS-101291-13 SELDI-TOF-MS for detecting serum protein biomarkers of smoking in North Chinese Han males**

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**Objectives:** To discover the potential biomarkers and establish a diagnostic pattern for smoking by using proteomic technology.

**Methods:** Serum proteomic spectra were generated by surface-enhanced laser desorption ionization time of flight mass spectrometry (SELDI-TOF-MS). A set of spectra, derived from analyzing serum from 40 smokers and 40 age- and sex-matched healthy non-smokers, was used to develop a decision tree model with a machine learning algorithm called decision boosting. A blinded testing set, including 10 smokers and 10 healthy non-smokers, was used to determine the accuracy of the model.

**Results:** The diagnostic pattern with a panel of three potential protein biomarkers of mass-to-charge (*m/z*) 3159.13, 7561.03, 9407.32 could accurately recognize 38 of 40 smokers and 39 of 40 non-smokers. Validation on the blinded testing set indicated that the decision tree could differentiate 8 of 10 smokers and 10 of 10 non-smokers.

**Conclusions:** The preliminary data suggested a potential application of SELDI-TOF-MS as an effective technology to profile serum proteome of smoking, and with pattern analysis, a diagnostic model comprising three potential biomarkers was indicated to differentiate smokers and non-smokers rapidly and precisely.

**PS-101364-13 Efficiency of Plasmacluster ion in killing of *Mycobacterium tuberculosis* on culture media** \*\*\*

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**Setting:** Prevention of tuberculosis transmission in environment is control ventilation, ultraviolet germicidal irradiation and filtration air with high efficiency particulate air filter. New innovation of Plasmacluster ion generation for air cleaning has been proved to be effective in killing pathogenic viruses, clinically important bacteria and fungus. There was no any study done for *Mycobacterium tuberculosis*.

**Objective:** To study the efficiency and exposure time of Plasmacluster ions in killing standard strain of

*M. tuberculosis* (H37Rv) and 50 isolated *M. tuberculosis* strains from tuberculosis patients on culture media in laboratory.

**Method:** Prepare suspension of bacteria with McFarland No.1 and diluted to 1:10000. Inoculate 0.1 ml. suspension on Middlebrook 7H10 media for 5 media. Incubate media in incubator at 37°C for 48 hours to check contamination. Expose 4 media at a distance of 1 foot from Plasmacluster Ions Generator in a closed chamber. After 15, 30, 45 and 60 minutes brought out one media each time. The unexposed media was used as a control. Incubate all media in incubator and read result after 3 weeks. Standard strain was repeated test for 3 times.

**Result:** For standard strains of *M. tuberculosis* there was no growth after exposure time of 30 minutes. For clinical isolate strains, there was no growth after exposure time of 15, 30, 45 and 60 minutes in 4 (8%), 4 (8%), 9 (18%) and 19 (38%) strains respectively. In 14 (28%) strains which has growth on media after 60 minutes of exposure, the number of colony on media was declined according to the longer exposure time.

**Conclusion:** Plasmacluster ions can kill *M. tuberculosis*.

#### PS-101427-13 Financing of TB in a low-income country: the case of DRC

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**Introduction:** The TB Program has a Development Plan 2006-2015, which cost \$545 861 560. Since 1996, the NTP applies the DOTS. The detection rate remains low (61%), but the success rate in treatment of new cases TPM + is 85% in 2005. The NTP is supported by the Government, the Global Fund (in Rounds 2, 5 and 6), Action Damien TLMI, USAID, The Union, WHO, ALM, UBS, CE detection rate is increasing with increased funding.

**Objective:** To show how PNTLT DRC could achieve efficient outcomes (indicators WHO) with a diversity of donors and the mode of financing.

**Methodology:** Full analysis of how and financing strategies of the Strategic Plan NTP DRC from 2006 to 2009.

**Results:** Four years after the implementation of its Strategic Plan, the NTP has mobilized \$79 079 743 (14.49%). The Gap cover is \$466 781 820 (85.51%) until 2015.

**Conclusion:** End 2009, the Strategic Plan has been funded at 14.49% and the number of diagnosed patients has increased from 98 139 to 111 851 for the same period.

#### PS-101444-13 Recruiting adolescents for an epidemiology study in Uganda in preparation for TB vaccine trials

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**Background:** A number of novel TB vaccines currently in early phases of development will need to be tested in large phase III trials in developing countries. Adolescents, a potential target population are not a usual target for vaccines and require both proxy consent and assent to participate. As a prerequisite, it is important to determine the incidence of TB and feasibility of forming, tracking and retaining a cohort in this population. As part of site preparation, we are conducting an epidemiological study to estimate the incidence and prevalence of Tuberculosis disease among adolescents in the Iganga/Mayuge Demographic Surveillance Site in Uganda.

**Methods:** A cohort of 7000 adolescents aged 12-18 years is being recruited and followed for two years. Adolescents identified from the DSS database are visited at home to obtain parental consent while assent is obtained at school. At enrolment, key demographic parameters, vital signs and relevant medical history are collected. All participants have TST administered to determine annual risk of TB infection. Participants identified as TB suspects as defined by the protocol undergo TB diagnostic work up which includes sputum coaching and collection of 2 sputum samples.

**Results:** Difficulty in obtaining parental consent and adjusting to the school calendar and schedule are the main challenges in recruitment. Out of 1269 participants enrolled, 1179 (93%) are school going. A total 499 met the criteria for TB diagnostic work up; 224 were TST positive ( $\geq 10$  mm), 69 had cough of  $\geq 14$  days and 106 had positive household contacts. So far, there are 6 smear positive participants of whom 4 are culture confirmed *M. tuberculosis* but none have HIV.

**Conclusion:** Early results indicate there is TB in this population and recruitment is feasible however sites need to devise ways of addressing the challenges.

#### PS-100778-13 The nutritional status IFN- $\gamma$ response of household and non-household tuberculosis contacts

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**Background:** Malnutrition has long been associated with the development of tuberculosis and may be re-