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Plenary Sessions

PL-01 Anti-TB drug resistance surveillance in China

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Background: China is one of the heavy TB burden countries with the number of TB cases ranked second in the world. In the recent years, Although China has effectively implemented DOTS strategy, Drug resistance-TB is one of main constraint factors of TB control in China.

Objectives: To study the trends of drug resistant tuberculosis prevalence in China.

Methods: The data from 1996 to 2006 in 13 provinces (WHO/IUATLD drug resistance surveillance (DRS) project) of which standardized method recommended by WHO in sampling, cases intake, laboratory examination methods were used to analyze the drug resistance prevalence situation in survey regions. Results The data show that the drug-resistant tuberculosis varied widely across different provinces of China, initial drug resistance rate and acquired drug resistance rate were 14.8–42.1% and 33.7–66% respectively.

Conclusion: Drug resistant-TB prevalence is severe problem in some regions of China. Effective measure should be taken to contain the transmission of drug resistance strains of tuberculosis, Nationwide anti-TB drug resistance survey seems to be needed to investigate the situation of drug resistance situation of whole country to provide scientific basis on evaluation the implementation of the NTP.

PL-02 A novel technology for rapidly and sensitive assay to detect changes in TCR V β clonality following antigen driven specific immune responses in human and animal models

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Academic and clinical investigators have continuously sought for prognostic or surrogate markers can monitor T-cell immune responses following viral infections, tumors, autoimmune disease, bone marrow transplantation, and especially in monitoring efficacy of vaccines and treatment therapies. We have recently developed a novel T-cell receptor (TCR) clonality/diversity assay in human and animal models for this purpose. The method is specially designed with one step multiple-PCR amplifications and a simple agarose gel assay. The most important features of the assay are that they require neither a DNA-sequencer nor an initial cDNA synthesis step. The entire process requires only a few hours, including PCR amplification time, by comparison, the DNA sequencer-based spectratyping assay requires at least 2 or 3 days to complete, and costs are much lower. As an investigative tool, the novel assay can be used to study various diseases related to immune-mediated disorders including viral infections, tumors, autoimmune

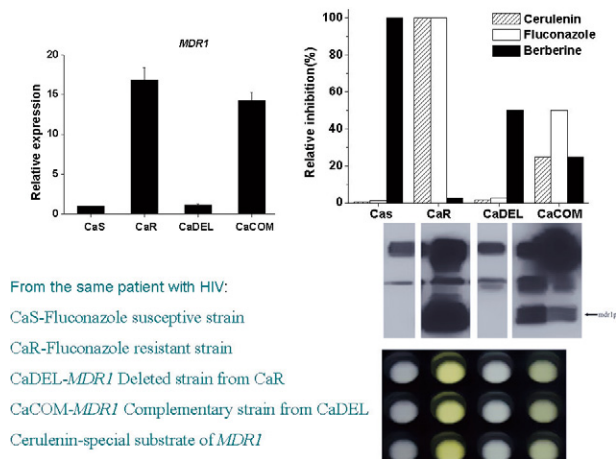
diseases, immune response following vaccination, and response after bone marrow transplantation. As a diagnostic tool, it can be used to monitor disease progression and track curative effects of antiviral or anti-tumor treatments.

PL-03 Harnessing multidrug resistance gene expression for effective antifungal strategies by a natural product berberine

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Multidrug-resistance pumps (MDR) in microbes and cancer cells are powerful defense mechanisms which confer resistance to chemically unrelated drugs. A major challenge in developing efficacious antibiotics against drug-resistant pathogens is to identify compounds that could sense, inhibit and counteract MDR functions. In the human pathogen *Candida albicans*, MDR1p plays a key role in clinical isolates with azole-resistance. Here we report an unexpected function of MDR1 in elevating the sensitivity of fungal pathogen to berberine for enhanced therapeutic efficacy. Berberine, a widely used traditional Chinese medicine identified as a potent fungicidal cofactor from our high throughput synergy screening (PNAS 2007; 104: 4606), is highly active against azole-resistant fungal pathogens. It appears that the elevated expression of MDR1 in resistant fungal strains confers sensitivity to berberine, showing enhanced cell killing with much reduced amount of berberine (Fig 1). This effect of MDR1 overexpression is at least in part attributed to enhanced accumulation of berberine. In support of this notion, a number of berberine structural analogues exhibited a similar MDR1-dependent antifungal activity (Fig 2). Berberine is indeed highly efficacious in inhibiting the growth of azole-resistant *C. albicans* isolates with upregulated MDR1 from HIV infected patients. It seems that nature outsmarted the defense mechanisms of fungal pathogen by using MDR1-dependent cytotoxic agents like berberine and its analogues. Our study reveals a novel function of MDR1 in raising sensitivity of drug-resistant fungal pathogens to selected natural products and thus shed lights on novel antifungal therapy.



From the same patient with HIV:
 CaS-Fluconazole susceptible strain
 CaR-Fluconazole resistant strain
 CaDEL-MDR1 Deleted strain from CaR
 CaCOM-MDR1 Complementary strain from CaDEL
 Cerulenin-special substrate of MDR1

Fig. 1.

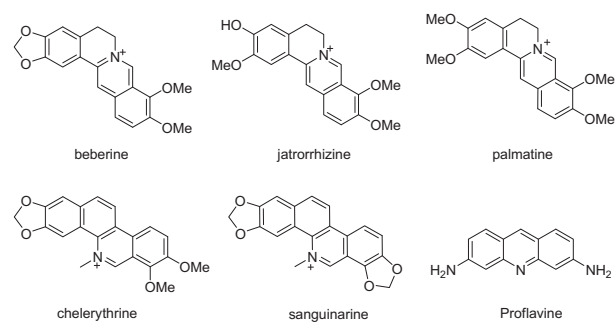


Fig.2a.

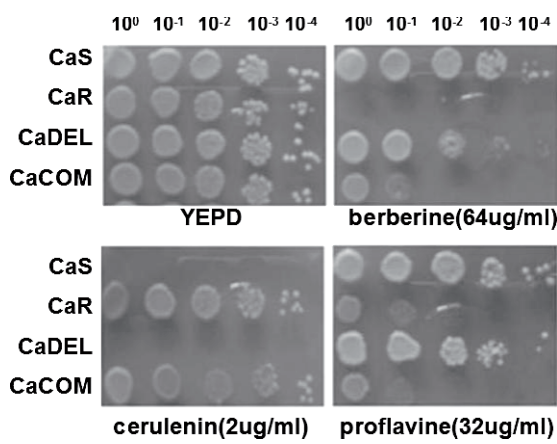


Fig.2b.

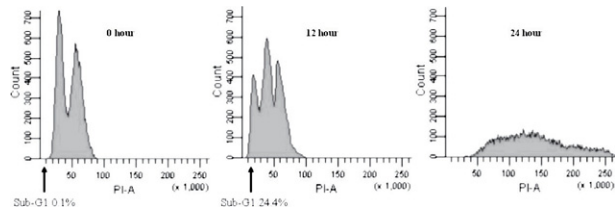


Fig.2c.

PL-04 Communicable diseases surveillance lessons learned from developed and developing countries: literature review

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Background: Surveillance of infectious diseases is recognized as the cornerstone of public health decision-making and practice. The aim of the evaluation of communicable diseases surveillance systems (CDSS) is ensuring that communicable diseases are monitored efficiently and effectively. The aim of this paper is to reflect on the experiences of both developed and developing countries in the evaluation of CDSS in order to learn lessons from these experiences to improve systems everywhere.

Methods: A literature review of studies published in English in PubMed and data bases of the World Health Organization (WHO), and Center of Diseases Control (CDC) from 1981 to 2007 was undertaken assessing CDSS. The studies were divided into those from developed and developing countries.

Results: A total of 32 studies were included, 20 from developed and 12 from developing countries. Both developed and developing countries faced difficulties in CDSS. Studies from the developed countries have been analyzed based on the quality of the system alone. In developing countries, most of the studies have been on the integrated diseases surveillance (IDSR) and have been performed shortly after the adoption of the IDSR. Thus it might be too early to make a fair evaluation. Some of the systems over-centralized, while some lacked private health sector involvement in the system. Further, some of the systems were affected by conflicts and civil wars which are common problems in developing countries.

Conclusion: None of the countries had ideal CDSS. The strategy of integrated diseases surveillance seems to be functioning well especially in Africa.

PL-05 MIDAS Public Disease Model

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The MIDAS* Public Disease Model is an agent based model (ABM) that uses synthetic data to simulate and describe influenza transmission within specific U.S. geographic areas. Each person in the region of interest is an agent and each agent is described by a number of demographic traits that define the social network interactions that the agents are part of. The agent traits that comprise the synthetic data were developed from US census, National Education Association and a provider of business information, InfoUSA, data sources. They represent the U.S. population at the time of the 2000 Census. The data include:

- A household in every Census tract that corresponds to a household in the 2000 Census.
- Persons who live in those households within the tracts such that their important Census tract level demographic characteristics match those of the 2000 Census.
- Locations of all public and private schools as well as pre-school and daycare facilities in the US that match a variety of publicly available sources. Location, enrollment and grade-level information are also defined.
- An age-specific school assignment plan that defines the schools attended by each school eligible person in the population.