bioMérieux : Pioneering Diagnostics

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Collaboration between China & Institut Merieux: Joint Clinical Research Unit at Fudan University Shanghai Cancer Center (FUSCC)

Lyon, France
June 2014
China & Institut Mérieux: a long history together

- Long history of collaboration between China & Institut Mérieux

- Creation in 2006 of the Joint Clinical Research Unit at the Fudan University Shanghai Cancer Center (FUSCC)
  - Dedicated to the discovery and validation of cancer biomarkers
  - An integrated Sino-Franco research team

- Mission:
  1) to reinforce public health and personalized medicine
  2) to meet the needs of patients and clinicians for in vitro diagnostics and immunotherapy
Results

- 10 high-impact scientific publications
- 5 patents from the work on colorectal and liver cancers
- Success in the discovery of an RNA signature in blood which can successfully screen individuals for the reliable detection of all stages of colorectal cancer without the necessity of colonoscopy
- January 2012: joint unit obtained a consortium agreement of 4 European countries, supported by The Seventh Framework Program (FP7) from the European Commission (EC).
  - The first Chinese-based laboratory which received financial support from the European Commission (EC)
  - The aims of this consortium:
    1) to increase the medical research cooperation between Europe and China
    2) to conduct research on the immune characteristics of Chinese cancer patients as medical biomarkers for a personalized prognosis
    3) to promote the Joint Research laboratory as the reference lab in Asia in the field of Cancer Prognosis
Xia Meng
Asia Pacific Scientific Director of bioMérieux
Identification and Validation of Peripheral Blood Biomarker for Colorectal Cancer Early Detection - Good Example of the success of the French Chinese Joint Research Forces

Fudan University Shanghai Cancer Center - Institut Mérieux Laboratory
Lyon, June 5th, 2014
Visions: An international research partnership
- To reinforce public health and personalized medicine
- To meet the needs of patients and clinicians, both *in vitro* diagnostics and in immunotherapy

Current missions: Research focusing on biomarkers for cancer
- This research laboratory is dedicated to oncology marker discovery and validation in order to improve cancer diagnostics, monitoring the cancer treatment and also cancer prognosis.
- Training regarding molecular technologies

A common goal: improving the care of cancer patients
Colorectal Cancers in China

- Colorectal cancer (CRC) is the 3rd most common carcinoma in China
- In 2012, about 400,000 new cases; 195,000 deaths
- CRC incidence is two times higher in China than in western countries.
- CRC is actually preventable and curable when diagnosed at early stage. Clinical studies demonstrated that CRC screening is effective at reducing the disease’s incidence and mortality rate
- Low compliance to colonoscopy in China
  - Fear of the procedure
  - 30-40% compliance with the procedure
  - Not always done with anesthesia
  - Only 7% of Chinese have private insurance

The national program of “Early detection and treatment of cancer in urban China” has been initiated in July 2012 by the Bureau of Disease Control, Ministry of Health, National Cancer Center and Chinese Academy of Medical Sciences in 9 provinces: Beijing, Chongqing, Hunan, Guangdong, Hebei, Shandong, Liaoning, Gansu and Heilongjiang. By 2016, this program should lead to the screening for 700,000-1,000,000 individuals at high risk of CRC.
FUSCC-IM Research on CRC from 2008 to 2013

Discovery  Lead Generation  Lead Confirmation  Technology Transfer  Validation Set I  Validation Set II

98 samples, 38,500 genes  215 samples, 38,500 genes  97 samples, 38,500 genes  200 samples, 52 genes  160 samples, 18 genes  260 samples, 18 genes


Microarray Platform Screening & Discovery  From Microassay to qRT-PCR  Biomarker Clinical Validation

Sensitivity: 86% Specificity: 92%  Sensitivity: 91% Specificity: 92%  Sensitivity: 78% - 87% Specificity: 83% - 89%
RT-PCR Model Setting Up
Identification of 18-gene signature in the Training Set

A. An estimated performance of 91.5% accuracy was achievable with a signature composed of the top 18 genes.

B. Positive fold changes indicate genes that are upregulated in CRC, whereas negative fold changes indicate genes that are down-regulated in CRC.
Validation of 18-gene signature in the Test Set I

![Graph showing the probability of CRC at different stages](image-url)
## CRC Detection in Blood: Molecular Tests

<table>
<thead>
<tr>
<th>Company</th>
<th>Test</th>
<th>Platform</th>
<th>Signature</th>
<th>Sensitivity</th>
<th>Specificity</th>
<th>Partner in China</th>
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</thead>
<tbody>
<tr>
<td>Epigenomics (Germany)</td>
<td>Epi proColon</td>
<td>real-time PCR</td>
<td>Septin-9 Methylation</td>
<td>68%</td>
<td>80%</td>
<td>Prospective screening study</td>
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<td>FDA submission</td>
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<td>December 2011</td>
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<td></td>
<td></td>
<td>75%</td>
<td>97%</td>
<td>BioChain (Beijing)</td>
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<tr>
<td>GeneNews (Canada)</td>
<td>ColonSentry</td>
<td>real-time PCR</td>
<td>7 genes</td>
<td>72.0%</td>
<td>70.0%</td>
<td>Shanghai Biochip Company</td>
</tr>
<tr>
<td>bioMerieux (China)</td>
<td>18-gene</td>
<td>real-time PCR</td>
<td>18 genes</td>
<td>90.3%</td>
<td>72.2%</td>
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</tbody>
</table>
**Publications**


**Patents**

- A kit for screening for colorectal cancer. China 201210361023.6

- Method and kit for determining in vitro the probability for an individual to suffer from colorectal cancer. PCT/CN2012/072931
Acknowledgment

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