



**BCIL seeks partners to license...**

## ***DNA chip for identification of drug transporter gene in Mycobacterium tuberculosis***

Biotech Consortium India Limited (BCIL) is seeking companies interested in licensing the oligonucleotide probes for identification of drug transporter gene in *Mycobacterium tuberculosis*. The oligonucleotide probes has been developed by Dr V M Katoch and his team at the JALMA Institute for Leprosy and Other Mycobacterial diseases, Agra, India and the DNA chip developed is used for the study of drug transporter expression profiling in multidrug resistant isolates of *Mycobacterium tuberculosis*.

### **About BCIL:**

BCIL was incorporated as public limited company in 1990 under the Indian Companies Act 1956. It is promoted by the Department of Biotechnology, Government of India and is financed by several all India financial institutions, venture capital funds and the corporate sector. BCIL has been actively involved in technology transfer, project consultancy, fund syndication, information dissemination, and manpower training & placement related to biotechnology over the last two decades. BCIL has transferred more than 15 technologies in the last 5 years using its expertise in facilitating licensing agreements that allow healthy and productive cooperation between the inventor and the licensee.

### **Technology Background**

Efflux pump has been identified as one of the major factor in the development of multidrug resistance in MDR-TB strains. Inhibitors of the efflux pump decrease the drug resistance incidence in *Mycobacterium tuberculosis*. Mycobacterium tuberculosis genome analysis reveals several genes encoding putative drug efflux pumps. Identification of those exporter genes and developing drug target against it could improve

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anti-tuberculosis therapeutics. PCR based methods such as direct sequencing of PCR products, SSCP analysis, heteroduplex analysis, dideoxy fingerprinting, an RNA/RNA duplex, base pair-mismatch assay, a luciferase mycobacteriophage strategy, a rRNA/DNA-bioluminescence- labeled probe method, a reverse hybridization-based line probe assay is in use to rapidly detect the range of mutations associated with multidrug resistance. Developing a specific probe and a custom oligonucleotide microarray for drug efflux transporter genes will help in identification of potential drug target for drug resistant *Mycobacterium tuberculosis*.

### **Technology Description**

The technology provides a novel set of oligonucleotide probes and primers for detection of drug exporter genes in multidrug resistant *Mycobacterium tuberculosis*. Further a DNA microarray is developed specific for the drug efflux pump genes to identify potential drug targets against multidrug resistant *Mycobacterium tuberculosis*. The DNA microarray can be used for gene expression profiling of drug transporter gene in multidrug resistant strains of *Mycobacterium tuberculosis*. The custom DNA microarray contains 25 drug efflux pump genes of *Mycobacterium tuberculosis*.

### **Technology Advantage and Highlights**

- ❖ ***A novel set of oligonucleotide probes and primers for drug efflux pump genes in multidrug resistant M. tuberculosis.***
- ❖ ***The custom oligonucleotide microarray is for identification of potential drug target for drug resistant strains of M. tuberculosis based on the gene expression profiling of drug transporter genes.***
- ❖ ***The DNA chip is used for identification of drug transporter genes of potential therapeutic or diagnostic use.***



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- ❖ *The probes and primers may be used to develop a kit for the detection of efflux mediated multidrug resistance in M. tuberculosis.*
- ❖ *The DNA chip is also used as diagnostic tool for rapid and early detection of infection.*
- ❖ *Probes once synthesized @ 45.00 Rs / base is enough to produce 1000 - 10000 DNA Chip.*



### **Validation**

The oligonucleotide probes and primers have been validated in 5 drug resistant isolates of *M tuberculosis*. Microarray analysis was done for each of anti-TB drugs on one multidrug resistant isolate and further verified by Real-Time PCR on five multidrug resistant isolates.

### **Patents**

This technology is patent pending.

"Probes and primers for identification of mycobacterial protein useful as potential drug targets"

Application No. : 2071/DEL/2007

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### **Publications**

- Anuj Kumar Gupta, VM Katoch, DS Chauhan, M Singh, R Sharma, K Venkatesan and VD Sharma. Microarray analysis of efflux pump genes in multidrug resistant *M.tuberculosis* during stress induced by common anti-TB drugs. *Microb Drug Res* (Accepted for publication).