

## Attagene's Breakthrough Transcription Factor Profiling Technology to be Described in Nature Methods

RESEARCH TRIANGLE PARK, N.C., Feb. 25 /PRNewswire/ -- Attagene Inc., a biotechnology company that develops innovative tools for signal transduction analysis, announced today that one of the Nature Research Journals highlights their flagship technology, the FACTORIAL(TM). In advance online publication on Nature Methods' website, Dr. Sergei Romanov with colleagues describes a novel and remarkably consistent method for simultaneously reporting on the activity of a large panel of transcription factors.

"The human genome has tens of thousands of genes, but only a fraction is expressed in a particular cell type at a given time. Understanding how gene expression is regulated is the Grail of the post-genomic era," says Dr. Sergei Makarov, Attagene's President and CEO, and the senior author. "A major hindrance is the lack of appropriate tools. We have found an entirely different way to characterize the functional status of cellular gene regulatory network."

Signals that modulate gene expression are relayed to genomic DNA by an intricate network of intracellular regulatory pathways. These pathways communicate with DNA by using transcription factors, proteins that bind particular sequences within target genes. An estimated few hundreds of transcription factor families hold the keys to regulation of the entire human genome; by assessing transcription factors activities one can capture the status of gene regulatory network. Therefore, Attagene's research team set to develop technology for assessment of activities of multiple transcription factors.

At the core of the proprietary technology, termed FACTORIAL(TM), is a set of reporter DNA constructs specially designed to evaluate particular transcription factors. When introduced into cell, the reporter constructs produce a spectrum of reporter RNA messages that mirror the activities of the evaluated transcription factors. These reporter messages are quantified by using an unconventional detection approach.

"A defining feature of FACTORIAL(TM) is that all reporter constructs have virtually identical reporter sequences and thus produce nearly identical messages," says Dr. Makarov. "These reporter messages are equally susceptible to broad variations in experimental and detection conditions, such as degradation, amplification, and thus their relative concentrations remain unaffected. From this homogeneity stems an amazing robustness and reproducibility of assessments."

Among many potential applications of FACTORIAL(TM), one of the most promising is drug evaluation and predictive toxicology. By observing alterations in transcription factors activities in response to drug candidates, one can immediately identify the involved pathways. By comparing signatures of evaluated drug candidates with databases of reference profiles, one can obtain invaluable information about drug candidate's mechanisms of action and potential side effects. In this regard, the FACTORIAL(TM) assay greatly synergizes with conventional system biology approaches, such as transcriptomics and proteomics. Akin to that, the FACTORIAL(TM) assay may prove invaluable for predicting toxic properties of environmental toxicants. This application has been validated as a part of the ToxCast program of the U.S. Environmental Protection Agency.

Currently, the prototypical FACTORIAL(TM) evaluates slightly more than 40 transcription factor families, but the system can be readily expanded by including additional reporters. Researchers believe that eventually they will be able to evaluate the entire complement of human transcription factors.

#### About Attagene

Attagene Inc. is biotechnological company founded in 2001 and located in the Research Triangle Park, North Carolina. Its mission is to accelerate drug discovery and development by providing innovative tools for examining signal transduction. Company's research team has scientists with academic and industrial background, with expertise in signal transduction, functional genomics, gene discovery, and disease models. Attagene's research has been funded by awards from the National Institutes of Health.

For more information,

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