

***Investment Brief for
A Pre-Clinical Evaluation Service:
Evaluate Compounds in Human Cells
before use in Patients***

***NSW
AREA HEALTH
SERVICES***

Office of Commercialisation

***For further information under a Confidential Disclosure
Agreement, please contact the following OoC team members***

***Dr Russell Carrington
Sydney West Area Health Service – Office of Commercialisation
Mob: +61 (0) 425 251 314
Ph: 61 2 9845 6079
e-mail: russell.carrington@officeofcommercialisation.com
Westmead Hospital PO Box 90 Westmead (Sydney) NSW
2145 Australia***

***Dr Christine Gockel - New York
Ph: 0011 1 716 341 7407
e-mail: christine.gockel@officeofcommercialisation.com***

A Pre-Clinical Evaluation Service: Evaluate Compounds in Human Cells before use in Patients

The Service

A contract research and development service, using a patented human embryonic stem-cell (hESC) line and its clonal lines as a ground-breaking tool for *in vitro* toxicology/teratology, efficacy and safety studies which mimic the human model¹. hESC-derived cell lineages with identifying tags will initially be developed in alliance with a Pharma/Biotech partner and will be used in high throughput screening of various compounds. Protocols will be developed to test new and existing compounds *in vitro* and will aim to meet regulatory approval (TGA/FDA/CE). The service will endeavor to meet the time- and cost-efficiency needs of small to large sized companies.

The Technology

Our patented clinical embryonic stem cell line, designated Endeavour-1 (E1), is largely serum-free and xeno-free which may be cultured under feeder-free conditions. Currently four patented clonal cell lines (E1C1, E1C2, E1C3 and E1C4) have been derived from Endeavour-1, and each offers an opportunity for homogeneous populations of cells for toxicological/teratological screening of pharmaceutical compounds. Each of these cell lines has proven pluripotency and long-term self-renewal and the ability to be differentiated into cells that exhibit the characteristics of one or more of three germ layers such as ectoderm, mesoderm and endoderm.

Applications and Advantages

- A convenient means for identifying the impact of compounds on humans without the ethical considerations associated with traditional studies in human subjects.
- A powerful pre-clinical research tool for new compounds under development.
- A complimentary dataset aimed to support clinical trial data for regulatory approval.
- A critical predictive tool for detecting side-effects (teratology) and adverse drug reactions (toxicity) of new and existing compounds that cannot be tested within the parameters of a clinical trial.
- A financial advantage to reduce risk associated with side-effects and adverse drug reactions identified post-marketing of a compound.

Market

In the last four decades 2.9% of marketed drugs were withdrawn from the market due to severe adverse drug effects². Withdrawal of a drug from the market does not only compromise a company's public image and harm the patient population it also causes a loss of potential revenues. The cost to develop a successful drug is estimated at \$800 million with an average development time of 12-15 years³. It is estimated that a drug manufacturer can reduce the cost of drug development by approximately \$350 million via an increased clinical success rate from 1 in 5 to 1 in 3 (saving \$221 million), and by reducing the total development and regulatory review time by 25% (saving \$219 million)⁴.

This service may be utilised by Pharmaceutical Manufacturers, Contract Research Organisations and smaller disease-focused companies to undertake pre-clinical toxicological/teratological studies that may indicate the potential success of clinical trial and/or as a complimentary dataset useful for local regulatory approval (FDA, CE or TGA). It is anticipated that all new compounds under development could be tested using this service to determine its likelihood of success in clinical trials. In addition, this service could be used to test drugs currently available in the market in order to identify potential adverse drug effects before the onset of harm to a company's public image, its revenue income and the patient population.

Commercialisation

Estimated upfront costs of approximately US\$250,000 per annum for 2 years will initially be required to develop the labeled-lineage-specific cell lines from hESC and protocols required for this service. Once the specific cell lineages have been purified, the service will be performed on a fee-for-service contract with all IP and publication rights reserved by the client. The terms of the service will require an upfront fee of 25% of total cost, an additional installment of 25% halfway during testing and the remaining 50% on receipt of the service report.

¹ C.W. Pouton and J.M. Haynes, Embryonic stem cells as a source of models for drug discovery. *Nature Reviews* 6 (2007) 605-616.

² K.E. Lasser, et.al., Timing of new black box warnings and withdrawals for prescription medications. *J. Am. Med. Assoc.* 87 (2002) 2215-2220.

³ J.A. DiMasi, et.al., The price of innovation: new estimates of drug development costs. *J. Health Econ.* (2003) 151-185.

⁴ J.A. DiMasi, The value of improving the productivity of the drug development process: faster times and better decisions. *Pharma-coeconomics* 20 (Suppl. 3) (2002) 1-10.