Seed fund Project

Artificial intelligence (AI) based EEG platform for drugs screening

Dr Gajendra Kumar (PIC)
Research Assistant Professor
Department of Neuroscience
City University of Hong Kong

Dr. Eddie MA (Advisor)
Associate Professor
Department of Neuroscience
City University of Hong Kong

Lau Po Chun
MSc Management (Finance)
University of Bath

JIN Yuting
Research Assistant
Department of Neuroscience
City University of Hong Kong
Current practice shortfall

Drug development industry

Break the barrier using AI

Business opportunity

Global Pharmaceutical CRO Market and Breakdown by Discovery, Pre-clinical, and Clinical, 2015–2024E


<table>
<thead>
<tr>
<th></th>
<th>Discovery</th>
<th>Pre-clinical</th>
<th>Clinical</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015–2019</td>
<td>10.8%</td>
<td>7.9%</td>
<td>8.7%</td>
<td>9.0%</td>
</tr>
<tr>
<td>2019–2024E</td>
<td>9.6%</td>
<td>8.2%</td>
<td>8.9%</td>
<td>8.9%</td>
</tr>
</tbody>
</table>
AniTech Limited (HK) was founded in June 2021.

It is a Pre-clinical CRO for drug development.

Company has its own neuro-diagnostic technology platform offering solutions for faster screening of CNS drugs.

Company provides customized method for drugs development using the rodent’s model.

Supported by HK Tech 300, Seed fund project, City University of Hong Kong.
## Our services

### ANIMAL MODELS
1. Alzheimer’s Disease
2. Parkinson’s Disease
3. Epilepsy
4. Stroke
5. Brain & Spine Injury Models
6. Ataxia mice model
7. Peripheral nerve injury model

### BEHAVIORAL TESTS
1. Anxiety and Depression
2. Cognition
3. Epilepsy and Seizure
4. Drug Abuse Liability
5. Motor Function
6. Pain
7. Peripheral nerve regeneration assessment tests.

### ROUTE OF DRUG ADMINISTRATION
1. Oral (po)
2. Intraperitoneal (ip)
3. Subcutaneous (sc) and intramuscular (im)
4. Intravenous (iv)
5. Intracerebelar ventricular (icv)

### IMMUNOHISTOCHEMISTRY
1. Samples and Sectioning
2. Immunohistochemistry
3. Imaging
4. Qualitative Histology
5. Quantitative Histology

### MOLECULAR BIOLOGY
- Genotyping of transgenic mice models
- Quantitative RT–PCR
- Quantitative Western Blot
- Rodent Primary Neurons and Glia Culture
- ELISA

### ELECTROPHYSIOLOGY
1. In Vivo brain electrophysiology (multi-channel neuronal recording)
2. Electromyography (EMG) recording
3. Epilepsy and Seizures monitoring by EEG
4. Sleep-Wake Polysomnographic EEG
<table>
<thead>
<tr>
<th>S. No</th>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Protocol writing</td>
<td>Preclinical studies (non-GLP and GLP) require a detailed protocol that is reviewed and approved by IACUC, the Institutional Animal Care and Use Committee. Study directors and principal investigators (PIs) spend a considerable amount of time writing these protocols which dictate the conduct of the study and eventual data-based results and reports.</td>
</tr>
<tr>
<td>2</td>
<td>Animal / model acquisition</td>
<td>A healthy model from a trusted vendor is key to the success of a preclinical study. Animal models from a purpose-bred USDA approved vendor designated as “Class A” or “Class B.” (Jackson’s lab, USA).</td>
</tr>
</tbody>
</table>
| 3     | Procedural facility         | The procedural costs take into consideration the length of the procedure and the requisite staff, facilities, equipment and supplies needed to perform the procedures based on the scope of work.  
Labour: Highly skilled is another important component of the procedure cost.  
Equipment: Equipment are in compliance with the federal code of regulations as well as the maintenance and calibration records to ensure GLP compliance.  
Per diems: Standard observations, husbandry and standard medications, food and water |
| 4     | Observations / follow ups   | SOAP examinations and are special tests.  
Clinical pathology: A good preclinical study, especially GLP, includes baseline pre-op, post-op, follow up and terminal blood work. |
| 5     | Supplies                    | Medical grade: Medication to sutures |
| 6     | Reporting                   | Our final reports for GLP studies include the incorporation of veterinary reports, necropsy reports, histopathology reports, pathology reports and completed by an independent and experienced team. |
| 7     | Third party vendors         | A preclinical study is often dependent on histopathology or toxicology. We have vet pathologist, CityU as collaborative partner. |
| 8     | GLP                         | For a GLP study, most CROs add a GLP surcharge. This charge exists for very good reasons. |
Studies covered by our company

Non-clinical studies for the conduct of human clinical trials

- Exploratory studies
  - Pharmacokinetics
  - Toxicology (Dose escalation) (2 weeks)
  - Genotoxicity (in vitro)
  - Safety Pharmacology
  - Efficacy Studies

- GLP studies
  - Toxicology (4 weeks) (2 species)
  - Genotoxicity (in vitro/in vivo)
  - Toxicokinetics
  - Safety Pharmacology
  - Reproductive Toxicology (Teratology/Female fertility)

- ADME (in vitro/in vivo/in silico)

Non-clinical studies during human clinical trials

Phase I
- Toxicology (3 - 6 months)

Phase II
- Reproductive Toxicology (Male fertility/Pre and Postnatal development)
- Chronic Toxicology > 6 months

Phase III
- Carcinogenicity

Consult and identify client requirement
Schedule research study
Finalise study protocol
Run EEG testing
Deliver final Report
High throughput EEG screening system
AI based EEG platform for screening of anti-epilepsy

Two-level machine learning architecture

Raw EEG → Feature extraction → Spectrogram

EEG spectrogram → Epoc validation → Classification by MATLAB

Classification: Normal, Epilepsy

Data annotation → Training the AI model

Machine learning level 1

City U model

Training: Mouse → Test: Mouse → Accuracy: 95.3%

Training: Human → Test: Human → Accuracy: 95.1%

VGG model (Oxford)

Training: Mouse → Test: Mouse → Accuracy: 93.7%

Training: Human → Test: Human → Accuracy: 92.8%

Training: Mouse → Test: Human → Accuracy: 76.2%
AI in Drug Discovery: Technologies and Applications

Artificial intelligence in virtual screening, de novo drug design, lead optimization, and chemical synthesis planning

AniTech Limited

Our platform in development......
Our collaborative partner and support

ISO 9001:2015 accredited

Technology support

Bio-Signal Technologies
Recruitment, collaborations and investor

**Talent Needed:** Biomedical Engineering experienced in EEG signal processing, MATLAB, Python, AI and cloud computing.

**Collaborators company:** IoT, AI and cloud computing, Pharmaceutical, cosmetics, Chinese medicine manufacturer.

**Investors:** We are looking for investor for the expansion of the company.

Contact for detailed information: gkumar@anitech.hk (www.anitech.hk)
Acknowledgement

Prof. Way Kuo: President, CityU
Prof. Michael Yang: Vice-President (Research and Technology), CityU.
Dr. Eddie MA: Associate Professor, Dept. of Neuroscience, CityU.

Seed fund support
(HKD 100k)
Thanks