Ketamine is the only highly effective non-opioid anaesthetic and analgesic drug. It has major advantages over opioids (e.g., codeines, fentanyls) in that it shows no respiratory depression or hyperalgesic effects, and is also free of longer term effects such as increased tolerance. Ketamine is primarily an N-methyl-D-aspartate (NMDA)-receptor antagonist with profound sympathomimetic properties. It has a rapid onset of action (distributive time only, <1 min) following intravenous administration, and generates a dissociative anaesthetic state. It has a terminal half-life of 2-3 hours, dictated by its hepatic and renal elimination.

The most important adverse effects associated with ketamine are its hallucinogenic properties. It has a relatively long elimination half-life (2-3 hours) and so is usually administered together with sedative or hypnotic drugs, such as midazolam and/or propofol, to try and reduce hallucinations. However, this concomitant use of propofol or midazolam increases the risk of respiratory depression and loss of the patient’s airway. Therefore, ketamine analogues with much shorter half-lives would be preferred and could avoid the concomitant use of sedatives and hypnotics.

We have developed very short-acting ketamine analogues with anaesthetic efficacy (in-vivo models) and reduced adverse effect profiles compared to ketamine.

**Applications**
- Anaesthesia in humans and animals for short procedures in the emergency department
- Anaesthesia for longer operations in patients in whom opioids are relatively or absolutely contraindicated
- Analgesic sedation for uncomfortable radiological procedures where access to the airway and breathing is difficult
- Analgesic sedation for use by paramedics in the field eg. Transport of trauma patients

**Key Aspects**
- Short action and reduced adverse effect profile enables increased use compared to ketamine
- Reduced use of potentially dangerous adjunctive sedatives or hypnotics
- Potential for downstream benefits such as resource savings associated with improved patient recovery times

**IP Position**
Provisional Composition of Matter Patent filed 8th October 2012.
A multi-disciplinary, experienced and highly successful collaboration.

This is a collaboration between the Department of Anaesthesia, Waikato Clinical School and the Auckland Cancer Society Research Centre (ACSRC) at The University of Auckland. Professor Jamie Sleigh, Professor of Anaesthesiology and Intensive Care, leads the collaboration.

The Waikato Clinical School is an academic division of The University of Auckland’s Faculty of Medical and Health Sciences. The school provides clinical teaching and research for undergraduate and postgraduate medical and allied health science students.

The ACSRC is a biomedical research centre within The University of Auckland. Focused on the development of new drugs for the therapy of cancer and infectious diseases, along with collaborators across The University, the ACSRC:

- Currently comprises 85 staff (some with >30 years’ service) and more than 20 research students.
- Is multi-disciplinary - skills include computer modelling, virtual screening, organic, inorganic and medicinal chemistry, genetics, molecular-, tumour- and radiobiology, pharmacology, and experimental and clinical oncology.
- Has extensive experience in joint academic/industry collaboration (approximately 40% of total revenue) and multi-disciplinary project management (with internal and external partners).
- Has a successful drug development record - 10 drugs brought to clinical trial, four currently in process to trial, many first-in-class: Amsacrine (1st synthetic topo II inhibitor to clinical trial, with Parke-Davis); DACA (1st dual topo I/II inhibitor to clinical trial, with Xenova), Vadiimezan (novel vascular disrupting agent, with Antisoma/Novartis), Canertinib (1st irreversible kinase inhibitor to clinical trial, with Pfizer), PR-104 (novel hypoxia prodrug of DNA cross-linker, with Proacta), PR-610 (novel hypoxia prodrug of kinase inhibitor, with Proacta).

The University of Auckland

The University of Auckland is New Zealand’s leading university and is the only one ranked among the world’s top 200 universities by the Times Higher Education World Rankings of Universities. It is also the highest ranked New Zealand university in the QS World University Rankings and the Shanghai Jiao Tong Academic Ranking of World Universities.

The University of Auckland is an international centre of learning and academic excellence. It is New Zealand’s pre-eminent research-led institution and has key linkages with many of the world’s top research intensive universities.

Based in the heart of New Zealand’s largest and most diverse city, The University of Auckland has the most comprehensive range of courses in the country. The University’s mission is to be a research-led, international university, recognised for excellence in teaching, learning, research, creative work and administration.

The University actively seeks to work with government, other universities, research organisations, businesses and commercial consultancies in research, development and education.

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