



Office of the Pro-Vice-Chancellor (Research Infrastructure)  
**Research Infrastructure Scheme:  
 Supporting Collaborative  
 Research**

## Infrastructure or Network Lab Project

### Application for Funding in 2018

Faculty	Medicine	
Family Name, Lead Investigator <small>(Please only name <b>ONE</b> person here)</small>	Nigel Turner	
Project Type	<input checked="" type="checkbox"/> Faculty Infrastructure Project <input type="checkbox"/> Mark Wainwright Analytical Centre Infrastructure Project <input type="checkbox"/> Network Lab  For any of the above, please indicate: <input checked="" type="checkbox"/> 1-year or <input type="checkbox"/> 2-year project	
Project title <small>(Please chose a title descriptive of the infrastructure requested)</small>	<b>Purchase of an Agilent Seahorse XFe96 Analyzer</b>	
Amount requested centrally (ex GST) <small>(For 2-year projects, detail the amount requested in each year)</small>	2018 \$ 340,026	2019 \$ 0
School / Faculty approved contribution, if applicable	2018 \$	2019 \$

# RESEARCH INFRASTRUCTURE SCHEME: *Supporting Collaborative Research*

## Application Form for Funding Support in 2018

When completing this application, please refer to the scheme's guidelines.

Applications must be lodged with the relevant School Office as a **single pdf** file by **18 September 2017** and must include:

- **A completed and signed Site and Services Checklist:** The lead investigator is asked to complete the checklist, sign the document as 'Project Lead' and obtain sign-off by the relevant Head of School as 'Sponsor' (refer to the checklist for instructions).
- **Suppliers' quotes for items to be purchased:** See Section 8 for details.

The Site and Services Checklist, quote templates, guidelines and other resources for this scheme are available at <https://research.unsw.edu.au/unsw-research-infrastructure-scheme>. Additional contacts for advice and assistance are listed at the end of this form.

Use this form for **Faculty or MWAC Infrastructure and Network Lab Projects** only. There is a separate form for **cross-Faculty Infrastructure Projects**, which involve **funding** from more than one Faculty or joint Faculty/ MWAC proposals.

## 1 APPLICANT(S)

### 1.1 Lead Investigator

The Lead Investigator is the project lead and will be the key contact person for the application for all correspondence. This should be the same person listed as under 1\* in the tables below. **Please only name ONE person here.**

Applicant number	Family name	Given Name(s)	Phone	Email
1*	Turner	Nigel	93852548	n.turner@unsw.edu.au

### 1.2 Applicant Summary (add additional rows if required)

Applicant number	Family name	Given Name(s)	Centre/ School/Faculty or Department	Email
1*	Turner	Nigel	SoMS/Pharmacology/Metabolic Disease	n.turner@unsw.edu.au
2	Morris	Margaret	SoMS/Pharmacology/Metabolic Disease	m.morris@unsw.edu.au
3	Ittner	Lars	SoMS/Anatomy/Dementia Research Unit	l.ittner@unsw.edu.au
4	Rye	Kerry-Anne	SoMS / Lipid Research Group	k.rye@unsw.edu.au
5	Hardeman	Edna	SoMS/Anatomy/Cellular and Genetic Medicine Unit	e.hardeman@unsw.edu.au
6	Yang	H Robert	BABS/Science	h.rob.yang@unsw.edu.au

7	Gilchrist	Robert	School of Women's & Children's Health/Medicine	r.gilchrist@unsw.edu.au
8	Hoehn	Kyle	BABS/Science	k.hoehn@unsw.edu.au
9	Thomas	Shane	SoMS/Pathology/Redox Biology Group	Shane.thomas@unsw.edu.au
10	Phillips	Phoebe	Pancreatic Cancer Translational Research Group/Medicine	p.phillips@unsw.edu.au
11	Saunders	Darren	SoMS/Pathology	d.saunders@unsw.edu.au
12	Simar	David	SoMS/Pathology/Immunometabolism Group	d.simar@unsw.edu.au
13	Kee	Anthony	SoMS/Anatomy/Cellular and Genetic Medicine Unit	a.kee@unsw.edu.au
14	Moalem-Taylor	Gila	SoMS/Physiology/Neuropathic Pain Research Group	gila@unsw.edu.au
15	Maloney	Chris	SoMS/Exercise Physiology/Metabolic Disease	c.maloney@unsw.edu.au
16	Smith	Greg	SoMS/Pharmacology/Metabolic Disease	g.smith@unsw.edu.au

## 2 EQUIPMENT, INFRASTRUCTURE OR SUPPORT REQUESTED

Provide a short description (max 1 page) of the equipment, infrastructure or support requested. For Network Labs, ensure the description includes the equipment/ facility to be supported as well as justifying the staff support requested.

This application seeks funding for an Agilent Seahorse XFe96 Analyzer, an advanced benchtop system that allows real-time measurement of cellular metabolism in live cells and tissue specimens in a microplate format. The Agilent Seahorse XFe96 Analyzer is the only system available on the market that allows for such a comprehensive measurement of metabolic function in a high-throughput format, with such small amounts of precious biological specimens - ***see attached 'sole source' letter.***

Mitochondrial function and glycolysis play critical roles in a variety of vital cellular processes, including cellular activation, proliferation, differentiation, cell death, and disease progression. The Agilent Seahorse XFe96 Analyzer profiles cellular metabolic functions, using label-free, solid-state disposable optical sensors. The Agilent Seahorse XFe Analyzers simultaneously measure mitochondrial respiration (oxidative phosphorylation; OXPHOS) via the oxygen consumption rate (OCR), and glycolysis via the extracellular acidification rate (ECAR). Integrated compound injection ports allow for up to 4 reagent additions (e.g. substrates, drugs, novel compounds) that can be programmed for automated delivery into the independent cell culture wells. The Agilent Seahorse XFe96 is designed so that only the disposable cartridges and plates are exposed to cells, medium or injection compounds, therefore, cleaning is not required between users. Agilent Seahorse XF technology also includes XF test kits and reagents that provide standard methods for quantifying mitochondrial respiration, glycolytic activity, endogenous and exogenous fatty acid

oxidation, substrate oxidation, and metabolic phenotype. In addition, the system comes with Windows-compatible desktop analysis software (Wave) for plotting, reporting, analyzing, and exporting Agilent Seahorse XF data.

Agilent Seahorse XF technology has been successfully used with >100 cell lines, including primary cells, adherent and suspension cell lines. Because Agilent Seahorse XF technology employs a label-free, non-invasive methodology, cells can be used post-measurement for other applications or chronic (long-term) experiments. Additionally the technology can be used for isolated mitochondria, 3D spheroids, model organisms (e.g. yeast) and other biological materials. Collectively this highlights the wide utility of this system for enhancing the research productivity of many groups based at UNSW by increasing experimental outputs and providing analytical strength that will drive collaborations within and beyond UNSW.

Because of the broad applicability of this technology, most major institutions have multiple Seahorse instruments onsite (e.g. Sydney University has 5 instruments). Currently at UNSW there are 2 'first generation' Seahorse instruments located in BABS; a 24-well Seahorse XF system located in the lab of Prof Bill Ballard and an old 96 well XF system that was donated to A/Prof Kyle Hoehn by Seahorse and is primarily used for industry-supported work. Neither of these systems are supported by service contracts, there is limited capacity for other researchers to access these instruments and most importantly, because of advances in technology, these older generation systems are being 'phased out' by the company, with difficulty in accessing parts and reagents expected in the near future - **see attached 'retirement letter' provided by the company**. Hence there is a great urgency to provide researchers in Medicine and across the wider UNSW campus with access to the most up-to-date Seahorse system to enhance their research capabilities and output.

### 3 LOCATION OF THE EQUIPMENT/ INFRASTRUCTURE/ STAFF

Provide a short description (max 1 page) indicating where the equipment/ infrastructure/ staff will be physically located. If the equipment/infrastructure will be installed "off-site", then provide details of the physical location and address, together with a statement on fractional ownership, if applicable.

This instrument would be located within the Wallace Wurth Building 3 East laboratory South lab, with A/Prof Nigel Turner as the custodian. The instrument would be available by booking through the School of Medical Science infrastructure management system, which also ensures training and monitoring of usage.

### 4 STRATEGIC PURPOSE OF REQUEST

Provide a short description (max 2 pages) of the impact the equipment/infrastructure/staff will have on improving UNSW's research capacity. In particular, consider how the requested infrastructure will:

- support world-leading research
- enhance collaborations, including across disciplines
- meet the strategic priorities of the Faculty and UNSW, including the university's [2025 Strategy](#)

The goal of Pillar A1 of the 2025 strategy is for UNSW to be known for world-class, innovative research that has a global impact. Key to this theme is having the most up-to-date and cutting edge infrastructure to support pioneering research. Access to an Agilent Seahorse XFe96 Analyzer will provide an immense boost to the capabilities of multiple UNSW researchers,

facilitating high impact research into diseases that represent the major health challenges of modern society and which are the thematic basis of research in the Faculty of Medicine. Specifically the Seahorse Analyzer will support numerous research programs investigating cancer, neuroscience and neurodegenerative diseases, inflammatory conditions and non-communicable diseases, such as diabetes, obesity and cardiovascular disease (detailed below).

The Agilent Seahorse XFe96 Analyzers have revolutionised our approach to assessing cellular metabolism. Since their introduction over a decade ago, Seahorse Analyzers have supported research published in leading journals including Nature, Science and the Cell family of journals, such that bioenergetic analysis with the Seahorse system is now an expectation in high-impact publications. All cells in the body require energy to carry out their normal functions and the fate of cells is intimately linked with their metabolic status. For example, availability of energy dictates whether a cell proliferates or is quiescent, reprogramming of metabolism is an essential step in immune cell activation and is also critical adaptation in cancer cells, while an impaired ability to appropriately metabolise fuels underpins the development of metabolic disease. These examples highlight the cross-cutting role of metabolism in the pathogenesis of most of major diseases and the potential to target metabolism for treatments. Importantly, the Seahorse XFe96 Analyzer supports research at all stages on the translational pipeline, from basic science to pre-clinical testing and direct assessment of clinical samples. Furthermore the ability to rapidly screen experimental compounds in this system is an imperative for drug discovery/development efforts at UNSW, as industry partnerships gain momentum with 2025 initiatives (e.g. Torch).

Clear evidence of the breadth of applicability of this system is the diversity of the research groups supporting this application and their clear alignment with the UNSW Medicine research strengths and themes. Recent publications by these teams in upper echelon journals (e.g. Science, Cell, Nature Comms, Molecular Cell, Diabetes, Cancer Research, Cell Metabolism) attests to the innovative nature of their work and research in these groups is underpinned by substantial competitive funding including NHMRC, ARC, Diabetes Australia, Cancer Institute NSW, Cancer Council, Cancer Australia, as well as industry funding (e.g. Merck, Novogen, Cook Medical) and venture capital investment in a recent startup company (Continuum Biosciences – A/Prof Hoehn) and through the TORCH initiative (Prof Hardeman). These research programs/groups have extensive collaborative networks with other research scientists and with local and international medicinal chemists and engineers, exploring pathomechanisms in disease and testing and developing novel therapeutic compounds and nanomedicines. Access to an Agilent XFe96 Seahorse Analyzer will facilitate ground-breaking translational research in these groups.

## **Cancer**

### **Turner, Hardeman, Yang, Hoehn, Phillips, Saunders, Kee**

Cancer metabolism is an emerging strength at UNSW, with several of the national leaders in this field based at UNSW. Studies focus on a range of cancer types (e.g. liver, pancreatic, endometrial), employ cutting edge technologies (e.g. nanomedicines) and models (patient derived cells), as well as novel anti-cancer candidate molecules targeting various metabolic pathways and the actin cytoskeleton (many developed in-house at UNSW). Standing in the field is illustrated by the fact that A/Prof Turner and Dr Saunders initiated the 1<sup>st</sup> Australian Cancer and Metabolism Meeting in 2015, with the third iteration of this successful meeting series planned for UNSW in 2019. Additionally Prof Yang is co-organiser of the Cold Spring Harbor Cancer Metabolism meetings in China every 2 years, highlighting international reputation. A recent TCRN-supported Round Table discussion in Sep 2017 between basic scientists and clinicians from POWH highlights the increasing interest in this area and the scope (and desire) for greater bench-bedside

interactions. The Agilent Seahorse XFe96 Analyzer can metabolically profile malignant tissues specimens and cells and is the only commercially available instrument capable of analyzing metabolism in 3D cultures, improving translatability of findings to patients.

## **Non-Communicable Diseases (metabolic and cardiovascular disease)**

### **Turner, Morris, Rye, Yang, Gilchrist, Hoehn, Maloney, Smith**

In the last 5 years there has been a substantial increase in critical mass at UNSW in the areas of metabolic and cardiovascular disease, as demonstrated by publications, funding, enrolled PhD students and the establishment of the annual UNSW Metabolic Research Symposium. Areas of research excellence and strength include early life health, lipid and mitochondrial biology, cardiovascular disease and HDL biology, metabolic signalling, obesity prevention, lipid droplet biology and oocyte health. High-end *in vivo* metabolic analyses and imaging are applied to innovative animal models and novel tools include mimetic peptides, novel compounds (some patented) and micronutrient supplements that target lipid metabolism, oxidant protection and mitochondrial function. Biomarker discovery in patients is also a core strength of the groups. Moreover these researchers interact with other key research themes such as neuroscience.

## **Neuroscience**

### **Ittner, Moalem-Taylor, Saunders**

Alzheimer's disease, neuropathic pain, motor neuron disease and neurobiology are the focus of researchers supporting this application. Prof Ittner combines world-leading expertise in the generation of genetically modified mouse models of Alzheimer's disease with molecular and imaging tools to define new pathological features of the disease (e.g. Cell 2010, Science 2016, Nat Comms 2017). Mechanisms of neuropathic pain, particularly induced by chemotherapy are investigated in sophisticated culture systems of sensory neurons in the Moalem-Taylor lab. The Saunders lab uses patient-derived iPS cells, transgenic models of neurodegeneration and 'omics approaches (proteomics, genomics and metabolomics) to better understand ALS pathology.

## **Inflammation**

### **Thomas, Simar**

Industry- and NHMRC-supported research into understanding oxidative metabolism in endothelial and immune cells is a focus of the Thomas lab. Dr Simar has a productive collaboration with the Center for Basic Metabolic Research at the University of Copenhagen (Denmark) and the Radiation Effect Research Foundation in Hiroshima (Japan) to understand immune and metabolic consequences in childhood cancer survivors.

The above clearly illustrates that investment in an Agilent Seahorse XFe96 Analyzer will facilitate the growth of UNSW's world-leading research capacity, and further enhance multi- and interdisciplinary collaborations across the campus and associated research institutes and with industry. This will strengthen biomedical research and advance the drug discovery and development capability of UNSW, translating basic science discoveries into patient treatments.



## 5 RESEARCH PROGRAMS/ GROUPS SUPPORTED

Provide a short description of the major research programs/ groups which will be supported by the equipment/ infrastructure, focusing on the significance and innovative nature of the research (max 1 page). For Network Labs (and other projects when applicable), provide a list of additional researchers or groups whose research will benefit.

The ability to accurately profile cellular bioenergetics with the Seahorse Analyzer would directly support the below research groups, including their dozens of ECRs and postgraduate students:

- A/Prof Nigel Turner's research focuses on ageing, diabetes and cancer, examining how various aspects of energy metabolism are influenced by different drugs, by different types of nutrients and by manipulation of specific genes and pathways.
- Prof Margaret Morris and Dr Chris Maloney address critical questions concerning the impact of adverse early life events and lifestyle factors on chronic disease. The impact of parental obesity is a key focus, with their work exploring offspring metabolic and cardiovascular risk, and options for intervention including novel micronutrient supplement they have developed.
- Prof Lars Ittner has made seminal contributions to understanding pathomechanisms in Alzheimer's disease. Mitochondrial dysfunction is a major contributor to this disease and spatio-temporal metabolic profiling during disease progression will provide novel therapeutic insight.
- Prof Kerry-Anne Rye's research aims to prevent heart disease and diabetes. She works with clinically relevant animal and cell models, novel mimetic peptides and state-of-the-art imaging techniques to identify new therapeutic targets.
- Prof Edna Hardeman and Dr Anthony Kee examine functions of the actin cytoskeleton, using mouse models and innovative microscopy. Their work involves the development of anti-cancer drugs targeting a specific tropomyosin isoform associated with many forms of cancer and involved in glucose metabolism.
- Prof H Robert Yang is one of the nations leading researchers in the field of lipid metabolism, with a focus on understanding processes involved in regulating intracellular lipid droplet formation and how changes in lipid droplets influence cellular metabolism and metabolic health.
- A/Prof Robert Gilchrist heads a research team that focuses on ovarian biology and specifically understanding growth factors and signalling pathways that maintain oocyte health, as well as novel translational approaches for the treatment of infertility, through *in vitro* maturation.
- A/Prof Kyle Hoehn studies cellular bioenergetics and nutrient metabolism in the context of obesity and obesity-related cancers. In recent years he has developed a number of novel compounds that influence metabolic pathways, including several directly targeting mitochondria.
- A/Prof Shane Thomas investigates endothelial cell dysfunction in cardiovascular disease and the role of the central immune regulatory enzyme Indoleamine 2, 3-Dioxygenase. Changes in cellular metabolism and mitochondrial function are critical to both arms of this research.
- A/Prof Phoebe Phillips has a research program targeting tumour cells and stromal pancreatic stellate cells which both contribute to chemoresistance and metastases in pancreatic cancer. Utilising relevant mouse models and cutting-edge nanomedicine, her work has established a critical role for the tumour microenvironment, including changes in metabolic pathways.
- Dr Darren Saunders investigates proteostasis and metabolic reprogramming in cancer and neurodegeneration. His uses various model systems (e.g. patient-derived cells) and integrates multiple experimental platforms to better understand genotype-phenotype relationships.
- Dr David Simar leads the Immunometabolism group, which investigates the role of cancer treatments in the development of long-term metabolic and cardiovascular complications and the contribution of epigenetic mechanisms in the remodeling of metabolic and immune functions.

- Dr Gila Moalem-Taylor’s research focuses on mechanisms underlying neuropathic pain caused by peripheral nerve damage. Her team uses several *ex vivo* neuronal models, with the ability to test bioenergetics key to identifying novel neuroprotectants.
- Dr Greg Smith leads a research program investigating the regulation of liver metabolism by the hormone glucagon and the effect of anti-psychotic drugs on metabolic homeostasis.

## 6 OPERATIONAL PLAN AND COSTS

Please provide a short description (max 1 page) of the operational plan for the infrastructure, including the expected ongoing operational costs associated with the project and how these will be met. Outline proposed access mechanisms where applicable. Network Labs are asked for more detail on meeting operational costs in the next section.

There are no implications for staffing or on-going operational costs. The instrument would be available by booking through the SoMS infrastructure management system, which also ensures training and monitoring of usage. Consumable costs would be met by the users. Maintenance will be covered by an extended warranty service contract providing maintenance and servicing for 3 years. After which the School of Medical Science will cover ongoing maintenance.

## 7 COST RECOVERY MECHANISM FOR NETWORK LABS

For Network Labs only, provide a short description (max ½ page) of a proposed cost recovery mechanism that will be implemented to recover operational costs. Consider for example hourly rates for instrument usage or annual subscription fees or a cost-sharing arrangement to recover costs of materials, service and maintenance, consumables etc. Please note that this is indicative only; the Office of the Pro-Vice-Chancellor (Research Infrastructure) and the Mark Wainwright Analytical Centre will assist successful applicants in the set-up of an appropriate cost recovery mechanism.

N/A

## 8 BUDGET SUMMARY

For proposals involving equipment:

- At least **three quotes must be attached** to the application for each item over AUD30,000 (incl. GST), and one quote for each item under AUD30,000 (incl. GST). If fewer quotes are provided, this must be justified in Section 9 Budget Justification. Quotes are not required for items under AUD3,000 (incl. GST).
- When requesting quotes from suppliers, please use the “Request for Quotes” template available at <https://research.unsw.edu.au/unsw-research-infrastructure-scheme>.
- For complex quotes, please provide a one page quote summary or clearly identify the relevant items (e.g. by highlighting).
- For successful applications, Strategic Procurement will be providing advice and support.

For proposals involving staff, please use the salary calculator provided by the Grants Management Office for budget calculations: [https://research.unsw.edu.au/document/salary\\_scales\\_for\\_grant\\_budgeting.xlsx](https://research.unsw.edu.au/document/salary_scales_for_grant_budgeting.xlsx).

If additional funding is being committed from other sources this must be clearly specified.

**For Network Lab proposals, a 25% cash contribution from the host School(s) / Faculty towards the total cost of the project is required.**



**For all two-year projects, including Network Labs, clearly identify the split of funds over two years.**

ITEM DETAILS / STAFF List equipment or other infrastructure purchase costs, specialist fit-out or set-up costs, IT infrastructure and staff costs (add rows if needed)	\$ COST	\$ REQUESTED CENTRALLY (ex GST)	\$ SCHOOL/ FACULTY APPROVED CONTRIBUTION (if applicable) (ex GST)	CONTRIBUTING SCHOOL(S)/ FACULTY(IES) (if applicable)
<b>2018</b>				
Seahorse XFe96 Analyzer Unit (including installation and training)	277,849	277,849		
Seahorse extended XFe96 Warranty – 2 years	60,000	60,000		
Memmert Incubator	2,177	2,177		
<b>2018 TOTAL</b>	<b>340,026</b>	<b>340,026</b>		

8.1 Appropriate on-going space is currently available to house/operate this equipment/ infrastructure/ staff (refer to Site Checklist provided)? Yes  No

8.2 The installation requirements (refer to Site Checklist provided) of the equipment to be purchased have been taken into account in the above budget estimates?  
Yes  No

8.3 Will there be a need for refurbishments? Yes  No

If Yes, will these refurbishment costs will be covered: (i) School/Faculty  OR (ii) a separate budget submission has been made via the Stay in Business Capital Funding (coordinated annually by Facilities Management) .

Please specify:

8.4 The OHS, Risk Assessment and Compliance requirements for the design, manufacture, importation, supply, installation/ erection, commissioning, use, alteration, dismantling, storage and disposal of the equipment have been taken into account? Yes  No

8.5 The on-going maintenance and technical staff requirements have been considered and will be covered by the School/Faculty budget? Yes  No

8.6 Has funding been sought from other sources for this or a closely related project?

- ARC LIEF Grant Yes  No
- Other External Research Grant Yes  No
- Operating budget Yes  No
- Strategic Priorities Funds Yes  No
- 2025 Strategy Business Case Yes  No
- Other sources Yes  No

Please specify:

8.7 Is this application eligible for consideration under the “NHMRC Equipment Grants funding” criteria outlined in the funding guidelines (Section 4.1b)? Yes  No

## 9 BUDGET JUSTIFICATION

Briefly (max 1 page) provide a justification and priority for each budget item requested. Costings for major ICT/ plant/ equipment where only one quote is provided need to be fully justified. If any item is to be jointly owned, or installed "off-site", this must be clearly specified and justified. For any staff support requested, justify the level of appointment.

The Agilent Seahorse XFe96 Analyzer is the only system of its kind and is available through a sole distributor in Australia (see sole source letter).

The additional 2 years of warranty, plus the 1 year of warranty included with purchase, provide a total of 3 years of preventative maintenance, servicing and part replacement, ensuring the system is functional at all times. The Seahorse XFe96 systems contain very unique and very specialised parts and replacement parts generally start at ~\$20,000, hence the \$30,000 per annum warranty costs.

The Memmert incubator is requested as the system is extremely sensitive to changes in temperature and performance is optimal if a dedicated incubator to pre-incubate and warm test plates is available directly adjacent to the system.

# APPENDIX A

## Contacts for Advice and Assistance

- **Office of the Pro Vice-Chancellor (Research Infrastructure)**  
Julia Muenchhoff (Project Officer)  
Phone: 02 9385 2979  
Email: [pvcresin@unsw.edu.au](mailto:pvcresin@unsw.edu.au)
  
- **Strategic Procurement**
  - **Research and major equipment:**  
Thomas Valin (Procurement Manager – Research and Major Equipment, Strategic Procurement/ Finance)  
Phone: 02 9385 2645  
Email: [t.valin@unsw.edu.au](mailto:t.valin@unsw.edu.au)
  
  - **IT related hardware/ software:**  
Adele-Rae McAneney (Procurement Manager – IT Procurement, Strategic Procurement/ Finance)  
Phone: 0419 167 484  
Email: [a.mcaneney@unsw.edu.au](mailto:a.mcaneney@unsw.edu.au)
  
  - **For general enquiries, please contact the Finance help desk:**  
<https://www.fin.unsw.edu.au/contact-help>
  
- **RECS – Research Ethics and Compliance**  
See <https://research.unsw.edu.au/recs> for contacts for advice on specific areas of compliance.

## Site installation checklist

<b>Project Title:</b>	Purchase of an Agilent Seahorse XFe96 Analyzer	
Proposed location: Building/ floor/ room #	Wallace Wurth 3 East laboratory South lab (rm 341)	
Is location approved by the School/ Faculty?	Yes	
Is operational budget required/ approved by the School/ Faculty?	Consumable costs would be met by the users. Maintenance will be covered by an extended warranty service contract providing maintenance and servicing for 3 years. After which the School of Medical Science will cover ongoing maintenance/repair costs.	
Is the space fit-out budget approved or is it dependent on a future allocation (e.g. Capex SIB or equivalent)?	No specific fit out required	
Specialist laboratory or site – specify type	It will be placed in an existing PC2 lab with no special approval required	Subject to approval by any of the following (select all that apply):  <input type="checkbox"/> Radiation Safety Committee <input type="checkbox"/> Animal Care and Ethics Committee <input type="checkbox"/> Gene Technology Research Committee <input type="checkbox"/> Other compliance (specify):
A site installation guide has been obtained from equipment suppliers?	Not applicable	
Services review carried out by:	Nigel Turner – lead applicant	

### **Specific Requirements:**

Accommodation/ space/ lab needs				
Service Category	Service	Service needed Y / N	Service available at site Y / N	Comments
Workplace	Staff to be accommodated, including number, FTE and level of each.	N		
Learning Environment	Students to be accommodated	N		
	Style of space; standard, PALS, student lead/other	N		
	Size and style of lectern & system interface requirements	N		
Whiteboards	Number/size/style	N		
Others (specify)		N		
Furniture/ Equipment	New/ existing or a combination?	N		
	If existing, is relocation and installation required?	N		

Security requirements	Card reader access control	Y		Existing for entry into 3 East laboratory
	Security cameras – note reason	N		
AV (audiovisual) requirements	Type and number of screens/ speakers	N		
	Content development proposal	N		
	Content management proposal	N		
	Other AV	N		
Power requirements	3 phase power	N		
	15 amp power	N		
	Additional power capacity/ circuits	N		
	Other special power (specify)	N		
	Back-up generator power	N		
	UPS or power conditioning	N		
IT requirements	IT cabling/ new ports	Y		Single port/connection to enable software updates
	High speed connectivity requirement	N		
	Data storage required	N		
	Equipment integration required	N		
	Data security requirements	N		
	Other IT infrastructure (specify)	N		
Heating/ Cooling	Equipment cooling water	N		
	Chiller/ heat exchanger	N		
	Close control of air conditioning (temp/ humidity/ pressure)	N		
	Air conditioning to deal with increased changed heat load	N		
	Cryogen supply	N		
Specialty gases, note type/s	Helium recovery	N		
	Gas reticulation/ specialist gases including Liquid nitrogen with or without phase separator	N		
	Gas dryers or other conditioning	N		
Environmental control	Ventilation extraction/ other specialist exhaust system	N		
	O2 depletion alarm	N		
	Other gas alarms	N		
	HEPA filtered air / other clean-room	N		

	PC2/ Clean room/ Biosafety/ Quarantine or related	N		
	Fume cupboard	N		
	Safety interlocks (e.g. laser lab)	N		
	Acoustic treatment needed	N		
	Hazardous waste	Y		Liquid waste will be disposed through standard procedures in the lab
Specialist Fire Services Requirements	Gas Suppression or VESDA (Very Early Smoke Detection Apparatus)	N		
Floor infrastructure	Heavy equipment – advise total weight & issues	N		
	Anti-vibration requirements or table / other large infrastructure	N		
General	Other specialist water supply	N		
	Sink and/or handwash	Y		Already existing in 3 East laboratory
	Safety shower and/or eyewash	Y		Already existing in 3 East laboratory
	Compressed air	N		
	Cardax reader, back to base alarm, other security or access control	N		
Other	Specify other WHS measures	N		
	Life Safety System for hazardous substances	N		
	Additional fire hazards	N		
	Other special services?	N		
<b>Site compatibility issues check</b>				
<b>Site requirement / issue</b>		<b>Service needed Y / N</b>	<b>Service available at site Y / N</b>	<b>Comments</b>
Equipment causes vibration, or electrical or magnetic interference		N		
Equipment is vibration sensitive, or sensitive to electromagnetic interference		N		
Space accreditation required: PC Lab/Clean Room/Animal Facility/Laser Facility		N		
Specialist finishes		N		
Other – specify		N		
<b>Specialist delivery costs &amp; services not included in purchase contract</b>				
<b>Delivery and access</b>		<b>Service needed Y / N</b>	<b>Service available at site Y / N</b>	<b>Comments</b>



Crane, specialist removals/delivery contractor, scaffolding, special access, other	<b>N</b>		
Decant/ temporary relocation required to enable refurbishment or installation to proceed	<b>No</b>		
Delivery access has been confirmed	<b>Yes</b>		
Services works /additions costed by	N/A		
Any other comments			
<b>Installation budget or estimate</b>	<b>\$ 0 – included with purchase</b>		

## #Contacts for Advice and Assistance

- **School / Faculty advice**

Where significant re-allocation or re-configuration of existing space, or Faculty-level financial and/or strategic support for refurbishment is required for a major project, please consult your Head of School/Centre and the General Manager or Infrastructure Manager for your Faculty.

Where new space allocation is involved, you will *also* require University-level approval.

- **Office of the Pro Vice-Chancellor (Research Infrastructure)**

Grainne Moran (PVC Research Infrastructure); Luc Betbeder-Matibet (Research Computing);  
 Julia Muenchhoff (Project Officer)  
 Phone: 02 9385 5600  
 Email: [pvcresin@unsw.edu.au](mailto:pvcresin@unsw.edu.au)

- **Strategic Procurement**

- **Research and major equipment:**

Thomas Valin (Procurement Manager – Research and Major Equipment, Strategic Procurement/Finance)  
 Phone: 02 9385 2645  
 Email: [t.valin@unsw.edu.au](mailto:t.valin@unsw.edu.au)

- **IT related hardware/ software:**

Adele-Rae McAneney (Procurement Manager – IT Procurement, Strategic Procurement/Finance)  
 Phone: 0419 167 484  
 Email: [a.mcaneney@unsw.edu.au](mailto:a.mcaneney@unsw.edu.au)

- **For general enquiries, please contact the Finance help desk:**

<https://www.fin.unsw.edu.au/contact-help>

- **RECS – Research Ethics and Compliance**

See <https://research.unsw.edu.au/recs> for contacts for advice on specific areas of compliance

- **Space Allocation**

For confirmation of all space allocation for projects and space advice, contact Jason Coombs, Director of Strategic Initiatives and Space Management, 9385 3781, [j.coombs@unsw.edu.au](mailto:j.coombs@unsw.edu.au)

- **Facilities Management**

For local building services advice, contact your Faculty CFM

For capital works, contact Anne Warren, Manager, Capital Program, FM, 9385 3946, [anne.warren@unsw.edu.au](mailto:anne.warren@unsw.edu.au)

For services infrastructure works, contact Greg Kaplan, Associate Director, Asset Management, FM, 9385 3831, [greg.kaplan@unsw.edu.au](mailto:greg.kaplan@unsw.edu.au)

- **Workplace Health and Safety**

Contact your Faculty's Health Safety Environment Coordinator in the first instance,  
<https://safety.unsw.edu.au/contacts>



**February 21, 2017**

## The Platform that Changed Metabolism Research is Retiring!

Over 10 years ago, the world was introduced to the Seahorse Extracellular Flux Analyzer. This instrument soon became a gold standard for mitochondrial research and enabled advancement of the field of cellular metabolism. Since then, we have been making significant improvements to the platform, increasing sensitivity, performance, and ease of use. As such, it is time to move forward to the latest technology for live-cell metabolism measurements and begin the process of retiring the XF series of instruments.

Product or Model Number	Product Description	End of Guaranteed Support (EGS) Date	Agilent Post-EGS Support Offerings
100736-100 100737-100	Seahorse XF24 Extracellular Flux Analyzer	12/31/2018	Limited
100736-101 100737-101	Seahorse XF24-3 Extracellular Flux Analyzer	12/31/2018	Limited
100900-100 100900-101	Seahorse XF96 Extracellular Flux Analyzer	12/31/2018	Yes

As these instruments approach their End of the Guaranteed Support (EGS) date, you have the choice of upgrading your instrument or continuing support on selected products.

### Instrument retirement/replacement options

This may be the time to take your technology to the next level. Instrument performance has evolved significantly in the recent years. By upgrading to an XFe Analyzer, you'll benefit from superior performance, greater usability, state-of-the-art technology, and lower overall cost of ownership. Agilent can make the transition as easy as possible. Instrument retirement and replacement programs and exciting trade-in programs are available.

**Contact your Seahorse Instrument Product Specialist to learn more about trade-in offers!**

### Post-EGS support options

Keep your instrument—and your peace of mind. After the EGS date, support is still available; you can access the Agilent CrossLab - Extended Services option to keep your instrument running. Agilent CrossLab's Extended Services provide a similar level of service that you enjoyed with Agilent CrossLab Services. On-Demand services can also be purchased on a time-and-materials basis.

Parts for Seahorse XF Analyzers are expected to be available after 12/31/2018 but supply is not guaranteed.

### A time of change, a time of opportunity

At Agilent, we're committed to helping you plan a smooth transition by providing timely information on future milestones, instrument upgrades that bring you the latest technology, and service solutions that maximize your investment. We also provide additional support services to keep you ahead of the curve in managing instrument lifetime:

- Relocation services to move existing instrumentation.
- Green Program to responsibly recycle your traded-in instruments (North America only)
- Customer education for customers who want classroom or on-site training to maximize their instrument productivity

### Put your transition plan into action

We're here to help. For details, contact your Seahorse Instrument Product Specialist and service Agilent representatives. For further assistance, you may also visit <http://www.agilent.com/crosslab> or call **(800) 227-9770 (US and Canada)**.

Thank you for your business. We appreciate your loyalty to Seahorse products and promise to make your experience with Agilent the best it can be—for years to come.

## 9) Sole Source Letter

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Dear Researcher,

Thank you for your interest in the Seahorse XF<sup>e</sup> (Extracellular Flux) Analyzer. The XF<sup>e</sup> Analyzer is the first and only commercially available instrument for scientific research that simultaneously measures the two major energy producing pathways in living cells, in real-time, in a microplate.

The first instrument was installed June 2006. In October 2007 the United States patent office issued Seahorse patent # 7276351 covering the novelty of the measurement for measuring multiple physiological properties of cells. Now over 1,500 scientists Worldwide are utilizing the XF<sup>e</sup> Analyzer for a faster, better and more accurate measurement of real-time cellular bioenergetics

Seahorse Bioscience is headquartered in Billerica, Massachusetts, U.S., and has regional offices in Copenhagen, Denmark; and Shanghai, China. XF<sup>e</sup> users have published more than 350 peer reviewed articles in top journals using XF technology, demonstrating that Seahorse has set the standard in the rapidly growing field of cell bioenergetics.

The following page is a list of unique technical features not found in any other instruments qualifying the XF<sup>e</sup> Analyzer for a sole source purchase.

Sincerely,

A handwritten signature in black ink that reads 'Steve'.

Steven M. Chomicz  
Vice President, Sales & Marketing  
(978) 671-1673  
[steve@seahorsebio.com](mailto:steve@seahorsebio.com)

A handwritten signature in black ink that reads 'Andrew Boslem'.

Andrew Boslem  
Product Manager - Cryopreservation  
+61 401 243 440  
[andrew.boslem@invitro.com.au](mailto:andrew.boslem@invitro.com.au)

*Sole Source Letter continued...*

## Unique Features of the XF<sup>e</sup> Extracellular Flux Analyzers

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### XF Technology:

- Simultaneously measures oxygen consumption rate (OCR) and extracellular acidification rate (ECAR) of living cells.
- Convenient, easy-to-use XF<sup>e</sup> Stress Test Kits and reagents simplify the study of cellular metabolism by providing pre-calibrated, pre-tested reagents for measuring mitochondrial respiration, glycolysis and fatty acid oxidation in cells.
- Uses disposable cell culture microplates.
- Non-invasive measurement requires no addition of dyes, labels or reporters.
- Cells/microplate remain viable following XF measurement and may be used for another assay.
- OCR and ECAR rate are calculated in 2-5 minutes using data acquired every 14 seconds.
- Measurements may be repeated indefinitely to measure kinetic responses.
- Typically requires only 30,000 to 80,000 cells per 24-well, 12,000 to 30,000 per 96-well assay.
- No cleaning required. All parts that contact cells, media or drugs are disposable.
- Measures adherent cells without requiring trypsinization.
- Suspended cells may be measured using Cell-Tak<sup>®</sup> cell and tissue attachment medium.
- Up to four test compounds may be added automatically to each well during the assay. Measurements may be performed before and after each compound is added.
- Measurement technology is covered by patent # 7,276,351.

### XF<sup>e</sup> Analyzer:

- Compact bench-top instrument 41cm W x 61cm D x 43cm H.
- High resolution, 19" touch screen controller for high productivity.
- Temperature controlled measurement chamber is maintained at 37°C +/-0.5°C.
- XF<sup>e</sup> data display shows OCR and ECAR data simultaneously.
- XF<sup>e</sup> Wave software provides integrated data analysis, and data is easily exported into MS Excel for transfer into other statistical analysis programs.
- XF<sup>e</sup> Wave software is provided with an unlimited-use license for one institution.

### XF<sup>e</sup> Assay Kits and Reagents:

- Standardized reagent kits and protocols designed for use with the XF<sup>e</sup> Analyzer.
- Convenient, quality controlled kits provide standardized metabolic measurements in an easy-to-use format.
- XF<sup>e</sup> sensor cartridges employ robust, low cost optical sensor technology.

- Optical sensors do not consume oxygen during the measurement
- Cell plates are tissue culture treated for optimum cell growth.
- Cells do not contact optical sensors.
- Optical sensors are not affected by drug compound or intracellular dye fluorescence.
- Each sensor cartridge is auto-calibrated. Data are reported in calibrated rates of pmol/min or mpH/min.

### **Sensitivity**

- Oxygen: 0.67 mmHg (Clark electrode is ~1.0mmHg).
- pH: 0.75mpH.

### **Excitation and Emission**

- Oxygen sensor peak absorption = 530 nm (green).
- Oxygen peak emission = 650 nm (red).
- pH sensor peak absorption = 470 nm (blue).
- pH sensor peak emission = 530 nm (green).
- Light Emitting Diodes (LEDs) are used as the monochromatic excitation source.
- LEDs are operated at very low excitation energy densities to prevent detectable levels of photobleaching.
- Narrow band pass filters control spectral adherence.

### **Kinetic Resolution**

- Measurement cycles are assay dependent; minimum recommendations for XF<sup>e</sup>24 are 1 minute mix, 2 minute wait, 3 minute measure, while the minimum recommendations for XF<sup>e</sup>96 are 1 minute mix, no wait time, 3 minute measure.

### **Drug Injection Ports**

- 4 drug injection ports are available.
- Injection volume is 75µl for XF<sup>e</sup>24, 25µl for XF<sup>e</sup>96.
- Drug injection is pneumatically controlled.

### **Data Quality**

Because XF assays are non-invasive, multiple measurements may be made to reduce data bias due to biological variability. Measurement-to-measurement within the same well demonstrates a coefficient of variation of  $\leq 5\%$ , approximately equivalent to the instruments' background noise.

- Total variability between wells from all sources (instrument background plus biological variability due to cells) for the average trained user is ~20%.





Associate Professor Nigel Turner  
School of Medical Sciences  
Wallace Wurth Building  
UNSW SYDNEY, NSW 2052

Dear Nigel,

Agilent Technologies has a rapidly growing base of over 800 Seahorse XF users' worldwide making novel discoveries and publishing their results. Our first published XF data was included in a Nature article written by Harvard researchers in January 2006 and there are now over 2000 publications in journals including Nature, Science, Cell and other top journals citing XF data. The XFp Extracellular Flux Analyzer.

As previously discussed, Agilent recently announced the end of guaranteed support for the XF24, XF24-3 and XF96 Seahorse extracellular flux analysers. Guaranteed support for these instruments will cease on 31<sup>st</sup> December, 2018. Support services will still be available after this date, but on a "best effort" basis only. Agilent will not guarantee that instrument parts will be available after 31<sup>st</sup> December 2018 but there are currently no plans to cease manufacture of XF24 consumables.

The performance of the Seahorse has evolved significantly in recent years. The benefit from superior performance, greater usability, state-of-the-art technology, and lower overall cost of ownership.

The current XFe generation of instruments offers the following advantages over the XF range:

- Single spot sensor design for better ECAR sensitivity and increased dynamic range.
- Support for the new glycolytic rate assay, a more specific, quantifiable measure of glycolytic acidification rates.
- Validated performance across a wider temperature range (16-42°C) allowing a greater variety of sample types.
- Seahorse Wave Controller software, easier to use with better analysis functions and integrated Proton Efflux Rate measurement.



Please find enclosed below your quotation with pricing for XFe24 & XFe96 Bioanalysers. This quotation includes, shipping costs and a complementary consumables to enable you to begin your experiments following installation. Following installation, our field application specialist will spend a day with you and your key users for detailed training and some advanced instrument maintenance to help avoid service calls. If there is anything else I can assist you with please let me know.

Sincerely,



Frances Casamento  
Life Science Equipment Specialist  
0421 585 840  
Frances.casamento@invitro.com.au

## Quotation No: CQT00045926B

Customer:.. UNSW - Faculty of Medicine  
Address:....School of Medical Sciences  
Wallace Wurth Building  
Room: 203

Representative:..... Frances Casamento  
Phone:..... 0421 585 840  
Email:.....

frances.casamento@invitro.com.au

Contact:.... Nigel Turner

Date Created:..... 18/09/2017

Valid Until:..... 19/10/2017

Phone No...0293852548

Customer Account... 11551

Email..... n.turner@unsw.edu.au

## DETAILS OF QUOTATION

QTY	ITEM NUMBER	DESCRIPTION	PRICE EACH	PACKAGE PRICING
1	SEAS7800A	<p><b>Seahorse XFe96 Analyzer, Per Unit</b></p>  <ul style="list-style-type: none"> <li>• O<sub>2</sub>/H<sup>+</sup> Dual Analyte Detection Capability</li> <li>• Integrated Automated Drug Delivery</li> <li>• Temperature Adjustable Measurement Chamber</li> <li>• Colour LCD Touch Screen &amp; Integrated Computer</li> <li>• Windows Based Data Acquisition &amp; Display</li> <li>• Desktop Analysis Software</li> </ul> <p><b>Consumables Included with Analyser Purchase</b></p> <ul style="list-style-type: none"> <li>• 2x XFe96 FluxPak Mini</li> <li>• XF Cell Energy Phenotype Test Kit</li> </ul>	287,953.00	277,849.00
1	SEAAPPSUPPORT	<p><b>Seahorse Application Support - Install &amp; Training (ea)</b></p> <p>Full day on-site training provided by applications specialist</p> <ul style="list-style-type: none"> <li>• Experimental Design</li> <li>• Assay Optimisation</li> <li>• Data Analysis</li> <li>• Troubleshooting</li> <li>• Instrument Maintenance</li> </ul>	1,000.00	<i>Included</i>
<p><b><u>Extended Warranty Option available only at the time of instrument purchase</u></b></p> <p><b><u>Full payment required</u></b></p>				
<p><b><u>Extended Warranty</u></b></p>				
2	SEAEXDWARRANTYXFe96	<p><b>Seahorse 1 Year Extended Warranty Seahorse XFe96</b></p> <p>Comprising all parts, labour, travel &amp; repairs and preventative maintenance.</p> <ul style="list-style-type: none"> <li>• 1 scheduled preventative maintenance visit per year</li> <li>• Software upgrades, new features &amp; enhancements included</li> <li>• Seahorse applications specialist to visit site (2 per year)</li> </ul>	30,000.00	60,000.00

- Day training session if required

Generally service will be conducted by an In Vitro Technologies or appointed repairer only during business hours (Monday to Friday).

First year warranty part of new equipment purchase + 2 years extended warranty option above

Total 3 year warranty on Seahorse XFe96  
Valid From 2018, until 2021.

#### The Annual preventative maintenance

Includes following parts:

- XFe96 ASY Manifold - SEA102205100
- Filter Fan - SEA100459000
- Seahorse XFe96 4 port FluxPaks Mini - SEA102601100

#### Optional Memmert Incubator

1	MEMIN30	Memmert Incubator In30, Singledisplay, 32L, 30°C - 80°C With 1 Grid, Per Unit	2,177.00	2,177.00
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❖ ABOVE PRICES SUBJECT TO 10% GST

❖ For all equipment orders over \$10,000 we require a 25% deposit due within 14 days of placement of order.

❖ For orders over \$50,000 an additional 50% is due upon delivery. The remainder is payable under standard terms on invoice.

#### QUOTE ACTIVATION

In order to receive this discounted pricing, you must first ACTIVATE YOUR QUOTE by one of the following methods: Fax 1300 552 004, Email [care@invitro.com.au](mailto:care@invitro.com.au), Phone 1300 552 003

You will not be charged for these goods until an official purchase order is raised, however, failure to activate this quotation may result in you being overcharged.

When placing an order for the goods on this quotation, please ensure that you quote the quotation number above.

#### CONDITIONS

Payment Term	: Nett 30 Days, For orders over \$10,000 25% deposit is due. Please refer to standard terms and conditions for more details.
Deposit	: For all equipment orders over \$10,000 we require a 25% deposit due within 14 days of placement of order. For orders over \$50,000 an additional 50% is due upon delivery. The remainder is payable under standard terms on invoice.
Delivery Time	: 8 - 10 weeks
Exchange Rate Used	: US - 0.80
<u>Warranty Conditions</u>	
Parts	: 1 year
Labour	: 1 year
Admin/Freight Charges	: Charges are \$39 Metro \$49 Regional, Heavy loads over 30kg at direct cost, standard equipment handling charge is \$68.
Other Conditions	: Please refer to the In Vitro Standard Conditions of Sale attached.

# IN VITRO TECHNOLOGIES PTY. LTD. GENERAL CONDITIONS OF QUOTATION AND SALE

A.B.N. 27102379895

1. **Interpretation.** In this Agreement the following definitions shall apply:  
"In Vitro" means In Vitro Technologies Pty Ltd ABN 27102379895 and its substitutes, successors, assigns and agents.  
"Contract Goods" means the goods ordered by the Customer from In Vitro as stipulated on the reverse;  
"Loss" means any loss, liability, damage, expense or cost whatsoever and includes (without limitation) indirect or consequential loss or damage, loss of profits or business opportunity, and damage to equipment or property.
2. **Price.**
  - 2.1. Prices quoted for Contract Goods are based on information available to In Vitro at the time of the Quotation ("Quoted Price"). In Vitro reserves the right to amend the Quoted Price at any time prior to acceptance of the order by In Vitro or otherwise in accordance with this clause 2.
  - 2.2. In Vitro is permitted to vary the Quoted Price, unilaterally by notice in writing to the Customer should there have been any circumstance that affects the Quoted Price including, but not limited to variations in; the rate of exchange (see Clause 2.3), the rate of Customs' duty (Clause 2.4), any applicable tax, including sales tax (Clause 2.6), GST or delivery costs (Clause 2.7), since the date of the quotation.
  - 2.3. Rates of Exchange. Prices quoted are based on currency rates of exchange at the time of quotation. Any variation in excess of \$45.00 from that rate of exchange at the time of delivery may result in a variation of the Price (the "Variation Amount") as determined by In Vitro in its absolute discretion.
  - 2.4. Duty Free. Should Duty Free prices be requested and subsequently quoted by In Vitro, it is understood by the Customer that such prices are based on the Contract Goods being indented from overseas against the Customer's order. It is then the responsibility of the Customer to provide In Vitro with the necessary documentation from the Customs Department to enable the items ordered to be brought into Australia Duty Free. Where duty fees are imposed for any reason whatsoever the Customer understands that it is responsible for these and that this will be added to the Price.
  - 2.5. "Ex-Stock". All Contract Goods quoted "ex stock" are subject to prior sale. For those items quoted on an indent basis, the delivery time is based upon In Vitro's knowledge at the time of quotation.
  - 2.6. Delivery costs. The Customer is responsible for all delivery and transport costs.
  - 2.7. Activation. In order to receive this discounted pricing, please ACTIVATE YOUR QUOTE by contacting Customer Care on either: Phone: 1300 552 003 Fax: 1300 552 004 Email: care@invitro.com.au OR when placing an order for the goods on this quotation, please ensure you quote the quotation number.
3. **Payment.**
  - 3.1. Where credit terms have not been agreed to, payment will be required within 30 days of invoice in full.
  - 3.2. Where separate credit terms have been agreed in writing, or as part of quote accounts will be settled as per those terms.
  - 3.3. Time of payment shall be the essence of the contract.
  - 3.4. For late payments over 30 days, a collections charge of \$45.00 per collections notice issued to the Customer may be levied at the discretion of In Vitro.
4. **Delivery and Risk.**
  - 4.1. Unless otherwise specified by In Vitro, the delivery point shall be In Vitro's premises and no failure or refusal by the Customer to take possession of any Contract Goods shall affect the time of Delivery.
  - 4.2. Any time stated for Delivery on an Order Form or otherwise is an estimate only and not of the essence of the Contract. In Vitro will in no event be liable for any late Delivery or loss sustained as a result or consequence.
  - 4.3. In Vitro shall not be responsible or liable for any loss or damage to any Contract Goods, or any loss or damage that the Customer may suffer in relation to the transport of the Contract Goods.
  - 4.4. At its discretion, In Vitro may store Contract Goods that have been ordered by the Customer and delivered to In Vitro, until such time as the Customer is ready to take delivery of the Contract Goods or In Vitro refuses to continue to store the Contract Goods (whichever occurs sooner). The Customer will be liable for all reasonable costs incurred by In Vitro in storing the Contract Goods from the time of Delivery.
5. **Retention of Title**
  - 5.1. Until the Customer has paid In Vitro for the Contract Goods, title in the Contract Goods will not pass to the Customer. Where the Contract Goods have been delivered to the Customer, the Customer must store the Contract Goods (in respect of which payment has not been made) separately from other Contract Goods that have been paid for and in a manner that allows the unpaid Contract Goods to be clearly identified.
  - 5.2. Until the Contract Goods are paid for, the Customer holds them as bailee at will holding for In Vitro.
  - 5.3. The Customer must keep the Contract Goods insured noting In Vitro's interest therein. Where the Contract Goods are destroyed or damaged, the whole of the proceeds of any insurance claim made by the Customer under its policy will be held by the Customer on trust for In Vitro and applied firstly in paying for the unpaid Contract Goods.
  - 5.4. Notwithstanding that title remains in In Vitro, the Contract Goods will be at the Customer's risk until they are paid for.
6. **Deposit.** Where stipulated in the body of the quote that a deposit is payable, the Customer must pay the deposit within 14 days of a request from In Vitro. Where the Customer is in breach of this Agreement and In Vitro terminates this Agreement as a result, the deposit will be forfeited to In Vitro. Until such time as deposit is received or order quote activated.
7. **Notification of Defects and Returns.**
  - 7.1. All breakages and short deliveries must be notified to the In Vitro Customer Care team within 72 hours of receipt ("Notice"). Failure to provide Notice as required by this clause will negate any responsibility of In Vitro for such breakage's and/or short deliveries.
  - 7.2. Only Contract Goods supplied in error or that are faulty will be considered for a refund or return after Notice.
  - 7.3. Where In Vitro otherwise agrees with the Customer to permit a refund in its absolute discretion, the return may be subject to a minimum 15% restocking charge or any other reasonable charge or cost incurred or otherwise levied by In Vitro.
8. **Warranty.**
  - 8.1. Except as expressly set out in this Agreement, all warranties, conditions and other terms implied by statute or common law are, to the fullest extent permitted by law, excluded from this Agreement. Without limiting the foregoing: (a) the Customer acknowledges that In Vitro does not manufacture the Contract Goods; and (b) In Vitro will not be held responsible for the incorrect description, use or application of the Contract Goods.
  - 8.2. The Contract Goods referred to in this quotation are warranted for a period as indicated in the body of the quote from the date of dispatch unless otherwise stated. Should any of the Contract Goods fail due to any defect in materials or workmanship, In Vitro undertakes to repair, free of charge. In Vitro does not warrant against failure of any component of the Contract Goods which is consumed in the normal operation of the Contract Goods including, but not restricted to lamps or illumination sources, thermocouples, electrical heaters or elements, batteries and items solely or partly manufactured from glass, silica or ceramic material. In any event this warranty does not apply to any fault in the Contract Goods which results from the negligence or malpractice of the Customer, its employee's, agents or any third party. The warranty does not apply to realignment or re-calibration of any Contract Goods, where the need for such re-alignment or re-calibration results from the ordinary use of the product.
9. **Commissioning.** Commissioning shall not be carried out by In Vitro unless previously agreed in writing by In Vitro. Where installation and commissioning is agreed to by In Vitro, it is the Customer's responsibility to provide all services and utilities required, including but not restricted to; electrical, water, air and waste connections. Where special handling or lifting equipment is required all costs and risk shall be borne by the Customer.

**IN VITRO TECHNOLOGIES PTY. LTD.**  
**GENERAL CONDITIONS OF QUOTATION AND SALE**

A.B.N. 27102379895

**10. Entire Agreement**

10.1. Any marketing material provided by In Vitro in respect of a quotation generally represents the Contract Goods, but may not comply in all respects to the item supplied, as manufacturers always reserve the right to make design or performance alterations without prior notification.

10.2. This Agreement is the entire agreement of the parties on the subject matter. The only enforceable obligations and liabilities of the parties in relation to the subject matter are those that arise out of the provisions contained in this Agreement. All representations, communications and prior agreements in relation to the subject matter are merged in and superseded by this Agreement.

**11. Modifications.** In Vitro will undertake to make minor modifications (e.g. power leads, plugs, fuse holders, etc.) but will not interfere with any function of the Contract Goods that may jeopardise the manufacturer's warranty. If the Customer desires to make further modifications, it must obtain written permission from In Vitro in advance before doing so. Despite any consent provided by In Vitro, all modifications are affected at the risk of the Customer.

**12. Indemnity.** To the maximum extent permitted by law, the Customer unconditionally releases, discharges and forever indemnifies and holds harmless In Vitro from, against and in relation to:

- i. all loss, damages, suits, demands, expenses or claims resulting from, connected with or based on any Contract Goods supplied by In Vitro to the Customer;
- ii. matters, circumstances, damages, losses or liabilities that have been limited or excluded in this document;
- iii. any breach by the Customer of this Agreement; and
- iv. any matters, circumstances, damages, losses or liabilities for which the Customer has assumed the risk in this document,

to the extent that the foregoing may exceed in any instance, the limit of In Vitro's liability set out in clause 13.

**13. Liability of In Vitro which is to include its directors, officers and agents.**

- i. To the maximum extent permitted by law, this clause 13 sets out the entire financial liability of In Vitro in respect of: (a) any breach of this Agreement; (b) any use of the Contract Goods by the Customer; and (c) any representation, statement or tortious act or omission (including negligence) arising under or in connection with this Agreement, or their subject matter.
- ii. Despite anything in this Agreement, In Vitro will not be liable to the Customer or any person by or through the Customer, whether in tort (including for negligence or breach of statutory duty), contract, misrepresentation or otherwise for: (a) loss of profit; or (b) loss of goodwill; or (c) loss of business; or (d) loss of business opportunity; or (e) loss of anticipated saving; or (f) loss or corruption of data or information; or (g) any special, indirect or consequential damage suffered by the Customer or any person by or through the Customer.
- iii. Despite anything in this Agreement, In Vitro's total liability arising under or in connection with this Agreement and its subject matter, whether in tort (including negligence or breach of statutory duty), contract, misrepresentation, restitution or otherwise, will be limited to the cost of the Contract Goods the subject of this Agreement to which the liability relates, or if that sum is not determinable, \$100.
- iv. In Vitro's sole liability for the breach of any guarantee under the Competition and Consumer Act 2010 (Cth) in regards to which liability cannot be excluded, is limited at In Vitro's option to the replacement or repair of the goods or supply of equivalent goods or payment for replacing or repairing the goods or supplying equivalent goods.

**14. Force Majeure.** If by reason of any fact, circumstance, matter or thing beyond the reasonable control of In Vitro, In Vitro is unable to perform in whole or in part any obligation under this agreement then:

- i. In Vitro is relieved of that obligation under this agreement to the extent and for the period that it is unable to perform such obligation; and
- ii. In Vitro will not be liable to the Customer for failure to perform such obligation or any loss sustained therein, to the extent and for the period of non-performance contemplated by this clause.
- iii. Where the force majeure event extends beyond one (1) month, either party may terminate this contract.

**15. No Variations.** Except where In Vitro exercises any of its price variation rights under Clause 2, this Agreement can only be varied in writing, where it is signed by an authorised representative of both parties.

**16. Survival.** Clauses 4, 5, 7, 8.1, 12, 13, 14 and any other provision, which by its nature survives termination or expiry of this document, will survive any termination or expiry of this document.

**17. Severance.** If any part of this document is, or becomes, legally invalid or unenforceable, the remainder of this document subsists and remains enforceable.

**18. Jurisdiction.** This Agreement is governed by, takes effect and will be construed in accordance with the laws of the State or Territory in which this Agreement is made and the parties irrevocably and unconditionally submit to the exclusive jurisdiction of the courts of that State or Territory and courts entitled to hear appeals there from