A SOLID BUSINESS CASE IN COLLABORATION WITH
THE "UNIVERSITY OF SYDNEY "

GENERAL INFORMATION ABOUT THE PROJECT

TARGET OF THE PROJECT:
Obstructive Sleep Apnea and Colorectal Carcinoma Cells

DEPARTMENT:
Charles Perkins Centre

HEAD OF PROJECT MANAGEMENT:
Dr. Kristina M. Cook - kristina.cook@sydney.edu.au

ROLE OF MCQ INSTRUMENTS:
To create and control specific hypoxic environments.

MORE INFORMATION ABOUT THE HEAD OF THE PROJECT

Dr Kristina Cook is a research fellow in the Charles Perkins Centre. Dr Cook completed her D.Phil. in Chemical Biology at the University of Oxford in a collaborative program with the NIH (USA) as an OxCam Biomedical Research Scholar.
She graduated Summa Cum Laude from San Diego State University, with a B.S. in Molecular and Cellular Biology and a minor in Chemistry (awarded a 'distinction', the highest honour).

DESCRIPTION OF THE APPLICATION AND THE TARGET

Obstructive sleep apnea (OSA) affects a significant proportion of the population and is linked to increased rates of cancer development and a worse cancer outcome.
OSA is characterized by nocturnal intermittent hypoxia and animal models of OSA-like intermittent hypoxia show increased tumor growth & metastasis. Advanced tumors typically have regions of chronic hypoxia, activating the transcription factor, HIF-1, which controls the expression of genes involved in cancer progression. Rapid intermittent hypoxia from OSA has been proposed to increase HIF-1 activity and this may occur in tumors.

We have built a cell-based model of physiological OSA tissue oxygenation in order to study the effects of intermittent hypoxia in HCT116 colorectal cancer cells. We found that HIF-1α increases following intermittent hypoxia and that the expression of HIF-target genes increases, including those involved in glycolysis, the hypoxic pathway and extracellular matrix remodeling. Expression of these genes acts as a 'hypoxic' signature which is associated with a worse prognosis. The total dose of hypoxia determined the magnitude of change in the hypoxic signature rather than the frequency or duration of hypoxia-reoxygenation cycles per se.

Full and original article: https://www.mdpi.com/1422-0067/20/2/445

BENEFITS AND SAVINGS

A traditional method would require a gas tanks of custom gas mixes (N2, CO2, O2) with timers and solenoid valves. Would have been quite difficult to set up compare to the easier MCQ Gas Mixers' system requirements.
The University of Sydney were seeking a solution for their study about Cell culture and intermittent hypoxia (low oxygen). Thanks to our instruments they can now customize a timed protocol of different periods of different oxygen levels to test on their cancer cells grown in culture.
The Gas Mixer makes cancer research into the effects of low oxygen (tumor hypoxia) much easier and with a less complicated equipment setup.

COST SAVINGS: -30%

The effectiveness of our Gas Blenders reduces consistently the gas consumption of 30%

FLOW RATES: NO CUT-OFF

The University of Sydney used a range of flows between 500 mL/min and 300 mL/min with a fast modularity.

TIME SAVINGS: -70%

Easier setup management of the hardware. Easier setup management of the software.

SOFTWARE AUTOMATION:

Thanks to our Gas Creator Software now the University of Sydney can bring forward experiments in automation,

SUCCESSFUL ACHIEVEMENT:

Setting an efficient normoxic and hypoxic environment and keeping it under control.

FLOW STABILITY:

Thanks to our revolutionary method every gas flow can have a great stability making possible to bring forward experiments with no surprises.

READY TO TALK ABOUT YOUR SOLUTION?

info@mcqinst.com - www.mcqinst.com