

Preclinical research in critical care — the Australasian perspective

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TO THE EDITOR: The lament by O’Leary¹ in response to a call for more basic research in the world of intensive care medicine² is understandable, but a more positive spin on the subject is possible. Speaking from experience, where considerable effort has been made to develop basic scientific and translational research, I certainly understand where he is coming from. The challenge of obtaining support for basic intensive care medicine research is difficult because the hospital environment is a service-driven one. It is not necessarily supportive of research, and competition for laboratory-based research funding is intense when competing with major scientific laboratories in well established universities and similar organisations.

In our intensive care environment, the type of research more likely to be supported is clinically oriented. Funding bodies are more likely to support studies in which the possible or probable outcomes of the study may be known before the study; for example, is treatment A better than treatment B? Institutional ethics committees also tend to favour programmed research in which the possible outcomes are pre-empted. They make for tidy applications and reduce the risk of failure; aspects which are important to the committees. Such studies, even when results are negative or neutral, can be judged successful, not necessarily by creating new diagnostic techniques or better treatments, but by the size of the grant and the impact factor of the journal they are published in. But do we ever stop to consider that we only find answers to the questions we can ask? In large multicentre trials, the answers depend on the limited questions capable of being asked.

Basic research, by definition, is crowded with unknowns. Many successful outcomes are serendipitous (eg, the discoveries of penicillin and WiFi), the subject matter is usually very narrow (eg, immune cell function, an uncertain renal marker) and an understanding of the specific details is limited to only a few enthusiasts. Hence, combining a study of uncertain immediate clinical value with a subject matter understood by very few (especially among funding bodies and ethics committees) has a greater chance of failure than success. It is not surprising that it is a tough pursuit. Larger research organisations, where the value of such research

is appreciated, can support smaller research studies within their overall activities. In intensive care, there is no such support.

So where is the positive spin? Many of the therapies we use in everyday practice have changed little over the years; for example, use of catecholamines in shocked patients, amiodarone or other old antiarrhythmics, antibiotics that have been available for decades, many ancient intravenous antihypertensives and the use of Gram stains in microbiology. Yet often, patients who could live for a number of good years, if they survive, die before our eyes, even though they receive the best therapies we can provide. For intensive care medicine to progress, there is a serious need for research from the ground up, from the tenets of basic science, and not only from multicentre trials that come down “from above”, involving the rearranging of prepared potential outcomes. Basic science research is required to examine in detail many aspects of critically ill patients; for example, how does their genotype affect their response to therapy, how do the drugs they receive affect tissue reactive oxidative species, and how is mitochondrial function affected by severe sepsis and how can it be manipulated? These are just a few of the questions we would like answers to.

These are exciting times for research in many other branches of medicine, giving us opportunities like never before. Individual basic science or translational research efforts in intensive care will never be universally popular or grab the limelight (until that scintillating result is available) but that should not deter us. We should eagerly accept the offerings now present in other areas of basic scientific and medical research, and learn how to use them to make major advances and improve the outcome for many of our critically ill patients.

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1 O’Leary MJ. Preclinical research in critical care — the Australasian perspective [letter]. *Crit Care Resusc* 2015; 17: 283.

2 Bihari S, Maiden M, Deane A, et al. Preclinical research in critical care — the Australasian perspective. *Crit Care Resusc* 2015; 17: 151-2.