



**Australian Government**  
**Office of the Chief Scientist**



**Australian Academy of Science**

## FOREWORD

It is easy for us to take for granted the importance of recent advances in science. Indeed, because science is so important to every modern economy, we can easily adjust our expectations. Paradoxically, the importance of science becomes invisible.

In commissioning the work reported here, we had two specific goals.

First, we want to (again) highlight the importance of recent advances in science to economic production, and the opportunities and income this creates for all of us. In this report, we take a special focus on the biological sciences. It is estimated that if recent advances in the biological sciences had not occurred, and the knowledge generated from them had not been discovered, our economy would be 5% smaller today. This is our 'middle' or central estimate, falling in a range of 4.2% to 5.9%.

Second, and importantly, we want to highlight that advances in the biological sciences contribute to outcomes other than economic production on which Australians place great importance. For example, it is estimated that without recent advances in the biological sciences, and the new medical vaccines, diagnostics, treatments and practices that have been driven by those advances, the burden of disease in Australia would be 18% to 34% higher. Further, the report illustrates how recent advances in the biological sciences are contributing to improvements in the environment, and the extent to which those improvements are valued by Australians.

This work follows a report that examined the contribution of advances in the physical and mathematical sciences to the Australian economy (see AAS 2015). We have published a separate report titled *The importance of recent advances in science to the Australian economy* that synthesises the key messages and conclusions from the two studies.

In doing this work, the Centre for International Economics (the CIE) has taken a rigorous but conservative approach to estimating the impact of advances in the biological sciences.



ABOVE LEFT:  
Australia's Chief Scientist,  
Professor Ian Chubb AC



ABOVE RIGHT:  
Professor Andrew Holmes AM PresAA FRS FTSE  
President  
Australian Academy of Science

# ADVANCED BIOLOGICAL SCIENCES\*—

underpinning Australian economic activity and worth \$46 billion each year

Biological sciences help to support our national wealth.

We need to continue our national commitment to the advanced biological sciences if we are to recognise opportunities and capture the rewards. It is of substantial economic benefit.

There is a lot at stake.



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Prepared for the Office of the Chief Scientist and the Australian Academy of Science by the Centre for International Economics

\*Advanced means science undertaken and applied in the past 30 years.



**3.6%**

3.6% of Australian economic activity relies directly on advanced biological sciences.



**\$46b**

The direct contribution of advanced biological sciences to the economy is around \$46 billion per year.



**464 000**

4% of total Australian employment (about 464 000 jobs) is directly related to advanced biological sciences.



**18%  
to 34%**

This is how much higher the burden of disease would be without advanced biological sciences.



**5%**

The total direct and flow-on impact of advanced biological sciences amounts to 5% of Australian economic activity or about \$65 billion per year.



**\$12b**

Exports associated with advanced biological sciences are worth around \$12 billion a year. This is 5% of Australia's goods exports and equivalent to 4% of total Australian exports of goods and services.



**\$83b to  
\$156b**

This is the value of health improvements from advanced biology.