

By email: onshoremrna@industry.gov.au

21 September 2023



Australian Academy of Science submission on the *Understanding our RNA potential: discussion paper*

The Australian Academy of Science (the Academy) welcomes the opportunity to comment on the *Understanding our RNA potential: discussion paper*.

A National RNA strategy should include:

- Intensification of investment in fundamental research in RNA science, building on Australia's strengths in RNA science.
- Clear research priorities - recommendations were identified by the National RNA Science and Technology Roundtable¹
- A national mission for RNA research driven by strategic investment across funding schemes
- Developing a local mixed-RNA manufacturing ecosystem
- Maximising opportunities for commercialisation through existing mechanisms such as the National Reconstruction Fund
- Building expertise through higher degree by research training and facilitating mobility between research and industry.

Australia's RNA potential intertwined with fundamental research

The only way to build a competitive RNA science and technology sector, including manufacturing opportunities, is to intensify our investments in **fundamental** RNA science research.

Australia has developed significant capacity in RNA science as a consequence of decades of patient, long-term investment in fundamental research. Continuing investment into fundamental research is the **only way** to unlock novel applications and improvements in RNA technology. They include solutions to uniquely Australian problems, such as sensing new biosecurity threats and supporting climate change adaptation in agriculture.

While we recognise the inclusion of a question on basic science in the discussion paper, its framing is fundamentally flawed. It is counterproductive to try and predict what science questions and basic breakthroughs will result in the development of new applications. Again and again, it has been basic research, primarily undertaken as part of the pursuit of new knowledge and understanding rather than for a specific applied outcome, that has been the critical seed for future applications.

Australia can create an innovative RNA research and development 'ecosystem' and become a strong global player in this disruptive industry, creating and manufacturing high-value RNA-based products for local use and exporting them to the world. However, maintaining significant RNA science and technology capability will only be possible if the investment is made to build and support the pipeline with sustained funding from fundamental research to translation and manufacturing.

Recommendations to advance Australia's RNA potential

Considering the uniquely Australian problems that stand to be resolved by RNA, the roundtable participants emphasised the centrality of fundamental research and determined a list of research priorities by balancing Australia's strengths against emerging global trends.

Support the priorities identified by the roundtable.

A national mission for RNA research driven by strategic investment and prioritisation across funding schemes. This mission should provide sustainable, long-term funding for projects from fundamental research to translation.

¹ Link to [Roundtable report](#)

A local mixed-RNA manufacturing ecosystem, including pilot facilities, to enable new Australian products to be developed from research. This will enable the production of pre-clinical trial components and Good Manufacturing Practice (GMP) sovereign manufacturing capability to support clinical trials.

Formalisation of cross-disciplinary coordination to develop a roadmap for a national RNA science and technology mission, to nurture the entire research to translation pipeline holistically and to connect the research community to each other and industry.

New and existing commercialisation mechanisms should be leveraged to establish a self-sustaining RNA biotech industry. Such mechanisms include incentives for the capture of new intellectual property, participation in opportunities in the Industry Growth Program and National Reconstruction Fund and focusing the R&D tax incentive.

Schemes to build capacity in entrepreneurial and translation expertise, including facilitating greater mobility between research and industry.

Additional opportunities identified by the Academy since the roundtable include:

- Building a centralised GMP facility for RNA production at small-to-medium scale to provide affordable access to pre-clinical product development and phase 1 clinical trial manufacture
- Establishing funding incentives and support for research collaboration pilot programs, including non-RNA researchers in relevant fields, to explore the potential for innovative new RNA solutions
- Coordination of a central RNA grouping to bring together RNA and RNA-adjacent stakeholders, including researchers and industry and manufacturing bodies
- Improvement of intergovernmental communication for RNA to ensure an aligned nationwide vision of RNA investment
- Encouraging research-linked SMEs with research and development-focused procurement schemes, such as the Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) in the United States.

Finally, a review of the science system and research translation training to ensure viable research careers in Australia would greatly strengthen Australia's capacity in RNA technology. RNA research exists in a broader context of the science sector, and many of the challenges faced by RNA researchers in research translation and commercialisation are also faced by the research sector at large.

These efforts would secure Australia's position in the emerging global RNA science and technology sector.

The summary statement and proceedings of the National RNA Science and Technology Roundtable are attached.

To discuss or clarify any aspect of this submission, please contact Mr Chris Anderson, Director Science Policy at Chris.Anderson@science.org.au.

Appendix

RNA science and technology research priorities

The Australian Academy of Science and the Australia and New Zealand RNA Production Consortium hosted a roundtable to identify Australia's RNA science and technology priorities in July 2021.

Considering the uniquely Australian problems that stand to be solved by RNA, the roundtable participants emphasised the centrality of fundamental research and determined a list of research priorities by balancing Australia's strengths against emerging global trends. These research priorities are as follows:

- RNA vaccines, including vaccines for people with autoimmune disorders
- RNA therapeutics
- RNA sensing tools
- The role of RNA in plant and animal development
- The role of RNA in brain function and disorders
- RNA chemistry
- Stability and advanced manufacturing of RNA therapeutics
- RNA delivery technologies.

Complementary key opportunity areas for RNA science and technology identified in more recent analysis by the Academy are:

- Vaccines and therapeutics for diseases with existing expertise and regional advantage
- mRNA vaccines for animals
- Agricultural applications through RNA interference
- Nanomedicine research for new RNA delivery systems
- Biosecurity monitoring and environmental sensing
- Innovative long non-coding RNA discoveries.