

RE: Site visit to Adelaide University laboratories to view research investigating the effects of PFAS on female fertility

On March 19, 2026, following the Senate Community Affairs References Committee Inquiry Meeting into the *Impact of microplastics and other toxics on human health*, Senators took part in a site visit to Adelaide University. The purpose of the site visit was to view ongoing research focused on determining the effects of PFAS (Per- and polyfluoroalkyl substances) on female fertility. During the visit, the Senators were hosted by myself, Prof Rebecca Robker, and Dr Cameron Schearer at the Adelaide Health and Medical Sciences Building within the ART Discovery labs. The Senators who attended were Senator Anne Ruston, Senator Penny Allman-Payne, and Senator Wendy Askew.

The visit commenced with an overview of our laboratories' work on PFAS, specifically that we use preclinical (mouse) models in which animals can be provided with precise amounts and types of PFAS compounds. For instance, in our recent publication (*Environmental Research* (2026) 296:124043) female mice were given three different PFAS compounds at doses to mimic the levels found in Adelaide tap water.



Our laboratory team then demonstrated to the Senators the types of assessments that can be performed on the reproductive tissues in order to pinpoint the cellular effects of PFAS exposure. The Senators were engaged in the presentations and asked several technical questions.

- 1) 'Ex vivo ovulation' is a methodology which can be used to precisely examine how the egg is released from the ovary. In our experiments, the follicle (cellular structure containing the egg) can be treated with compounds to mimic environmental contaminants. Two research students, A. Mungur (Master of Biotechnology student) and T. Williams (PhD student) explained how these experiments are conducted and showed examples of their work, as well as a time-lapse movie of the ovulation process.
- 2) To precisely view embryo development, our experiments conduct in vitro fertilisation (IVF) using mouse eggs and sperm. PhD student M. Frost demonstrated the Computer-Assisted Sperm Assessment (CASA) technology. Using this technique, it is possible to obtain comprehensive measurements of sperm motility and determine the effects of environmental contaminants.
- 3) Examples of mouse embryos immediately after fertilisation were shown. Research Assistant D. Holland demonstrated the method that is used, including in IVF clinics, to remove excess sperm and transfer the 1-cell stage embryos (zygotes) to the culture media in which they will develop for the next five days to the blastocyst stage (a group of approximately 80 cells). These types of in vitro experiments enable us to change the environment of the embryo under controlled conditions and measure the effects.



4) To most precisely measure embryo development, we use timelapse morphokinetics in which the embryo is imaged every 10 minutes for up to five days. We viewed a series of these movies which provide detailed information on the timing of cell division and the shape (morphology) of the embryo. We discussed the stages of preimplantation embryo development and how different environments, including contaminants such as PFAS, can affect embryogenesis.



5) There are a number of methods to measure cell stress in embryos, and some of these assays were demonstrated and explained by Dr Yasmyn Winstanley. Specifically, examples were shown of embryo assessments for mtROS (a measure of oxidative stress), DNA damage (which influences whether cells can remain viable) and detection of inner cell mass (the cells that form the embryo) and trophoblast (the cells that form the placenta). Our research found that the embryos of female mice exposed to PFAS had higher levels of cell stress and examples of each were shown.

The site visit lasted approximately 1 hour. At the conclusion the Senators were escorted from the laboratories by Ms Pat Casbarra (Adelaide University Senior Government Relations and Policy Adviser). This summary report of the site visit was prepared by Prof Rebecca L Robker and Dr Cameron Shearer.



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