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MEDIA RELEASE

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Radioactive DNA Decontaminated in World-First

World-first counter terrorism research at ANSTO¹ has discovered a new method to safely decontaminate radioactive DNA and preserve the sample, reported ANSTO's on-line magazine *Velocity* today <http://velocity.ansto.gov.au>

The growing threat of radiological materials being used for malevolent purposes means forensic biologists may be presented with criminal evidence contaminated with radioactive materials, which would compromise the quality of the DNA sample.

However, research by ANSTO scientist David Hill and PhD student Serena Abbondante from the University of Canberra found that preserving the DNA found in radioactively contaminated biological samples can be done safely and effectively using a special magnetic resin.

"Using magnetic resin to remove and purify DNA after contamination is the most effective and safe method in existence and is currently being adopted by law enforcement agencies around the world," said Dr Hill.

"DNA can live in all fragments of our selves - skin, hair, saliva, but in extended contact with high levels of radioactivity it can get severely damaged. This means that in the event of a radiological attack, biological evidence may be slowly destroyed by radiation, making it extremely difficult for forensic scientists to trace the people responsible.

"If a crime committed involves radioactive material and the perpetrator leaves DNA behind, it's likely that it will be contaminated. So it's imperative that the DNA is removed from the radioactive material without damaging the quality of the sample, which can be tricky," he said.

"To overcome this problem we use the extraction techniques we have developed as part of ANSTO's counter terrorism project to help Australia prepare, prevent, respond and recover in the event of a radiological incident," he said.

The first step in the DNA extraction procedure is to incubate the biological material in a solution containing magnetic resin. The resin provides a solid support for the DNA to bind to, and the liquid solution washes away and removes radioactive material and other contaminating materials. The decontaminated DNA can then released from the magnetic resin into a clean solution so the DNA can be analysed.

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¹ Australian Nuclear Science and Technology Organisation, Lucas Heights

Ms Abbondante said she found that the greatest advantage the procedure provided was the ability to simultaneously extract and purify the DNA in a single step.

"It can also be automated, which may provide an additional level of protection from exposure for the analyst," she said.

Since the development of this technique, the technique has been proved and adopted by law enforcement agencies in the United Kingdom, the United States, Canada and Singapore.

"The technique can be used in the crime scene reconstruction after the terrorist use of a 'dirty bomb', where radioactive materials are dispersed with the aid of explosives, or possibly for use in intelligence gathering at clandestine laboratories where manufacture of these devices take place.

"We need to recognise that these scenarios may pose unique challenges to existing forensic agencies, as presently there is limited information on analytical methods or handling procedures for biological samples that are contaminated with radioactive materials," Ms Abbondante concluded.

Much of the research was also conducted in collaboration with Forensic & Technical, Australian Federal Police who gave Ms Abbondante use of its laboratories.

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