

Study demonstrates rapid decline in male dog fertility, with potential link to environmental contaminants

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A study led by researchers at The University of Nottingham has discovered that the fertility of dogs may have suffered a sharp decline over the past three decades.

The research, published in the academic journal *Scientific Reports*, found that [sperm quality](#) in a population of stud dogs studied over a 26-year period had fallen significantly.

The work has highlighted a potential link to environmental contaminants, after they were able to demonstrate that chemicals found in the sperm and testes of adult dogs - and in some commercially available pet foods - had a detrimental effect on sperm function at the concentrations detected.

As 'man's best friend' and closest companion animal, the researchers believe that the latest results may offer a new piece of the puzzle over the reported significant decline in human [semen quality](#) – a controversial subject which scientists continue to debate.

Dr Richard Lea, Reader in Reproductive Biology in the University's School of Veterinary Medicine and Science, who led the research said: "This is the first time that such a decline in male fertility has been reported in the dog and we believe this is due to environmental contaminants, some of which we have detected in dog food and in the

sperm and testes of the animals themselves.

"While further research is needed to conclusively demonstrate a link, the dog may indeed be a sentinel for humans – it shares the same environment, exhibits the same range of diseases, many with the same frequency and responds in a similar way to therapies."

The study centred on samples taken from stud dogs at an assistance dogs breeding centre over the course of 26 years. Professor Gary England, Foundation Dean of the School of Veterinary Medicine and Science and Professor of Comparative Veterinary Reproduction, who oversaw the collection of semen said: "The strength of the study is that all samples were processed and analysed by the same laboratory using the same protocols during that time and consequently the data generated is robust."

The work centred on five specific breeds of dogs – Labrador retriever, golden retriever, curly coat retriever, border collie and German shepherd – with between 42 and 97 dogs studied every year.

Semen was collected from the dogs and analysed to assess the percentage of sperm that showed a normal forward progressive pattern of motility and that appeared normal under a microscope (morphology).

Over the 26 years of the study, they found a striking decrease in the percentage of normal motile sperm. Between 1988 and 1998, sperm motility declined by 2.5 per cent per year and following a short period when stud dogs of compromised fertility were retired from the study, sperm motility from 2002 to 2014 continued to decline at a rate of 1.2% per year.

In addition, the team discovered that the male pups generated from the stud dogs with declining semen quality, had an increased incidence of

cryptorchidism, a condition in which the testes of pups fail to correctly descend into the scrotum.

Sperm collected from the same breeding population of dogs, and testes recovered from [dogs](#) undergoing routine castration, were found to contain environmental contaminants at concentrations able to disrupt sperm motility and viability when tested.

The same chemicals that disrupted sperm quality, were also discovered in a range of commercially available dog foods – including brands specifically marketed for puppies.

Dr Lea added: "We looked at other factors which may also play a part, for example, some genetic conditions do have an impact on fertility. However, we discounted that because 26 years is simply too rapid a decline to be associated with a genetic problem."

Over the past 70 years, studies have suggested a significant decline in human semen quality and a cluster of issues called 'testicular dysgenesis syndrome' that impact on male fertility which also include increased incidence of testicular cancer, the birth defect hypospadias and undescended testes.

However, declining human semen quality remains a controversial issue – many have criticised the variability of the data of the studies on the basis of changes in laboratory methods, training of laboratory personnel and improved quality control over the years.

Dr Lea added: "The Nottingham study presents a unique set of reliable data from a controlled population which is free from these factors. This raises the tantalising prospect that the decline in canine semen quality has an environmental cause and begs the question whether a similar effect could also be observed in human male fertility."

The paper, Environmental Chemicals Impact Semen Quality in Dogs in Vitro and May be Associated with a Temporal Decline in Quality and Increased Cryptorchidism, is available to view at the website for the journal *Scientific Reports* after the embargo lifts. An embargoed copy of the paper is available from the contacts below before publication.

More information: Richard G. Lea et al. Environmental chemicals impact dog semen quality in vitro and may be associated with a temporal decline in sperm motility and increased cryptorchidism, *Scientific Reports* (2016). [DOI: 10.1038/srep31281](https://doi.org/10.1038/srep31281)

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