

Nidacon News

The news letter from your ART supplier • No 2 • 2023

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Decline in sperm count due to pesticides

Pesticides used in our homes, gardens and lawns and sprayed on foods we eat are contributing to a dramatic decline in sperm count among men worldwide, according to a new analysis of studies over the last 50 years

Over the course of 50 years, sperm concentration has fallen about 50% around the world. While there are likely many more contributing causes, the study demonstrates a strong association between two common insecticides – organophosphates and N-methyl carbamates – and the decline of sperm concentration.

One of the most frequently used compounds in the world, organophosphates are the main components of nerve gas, herbicides, pesticides and insecticides and are also used to create plastics and solvents. They're available for consumer purchase so organophosphate exposures have been demonstrated to be relatively widespread.

Sperm is an incredibly sensitive endpoint when it comes to overall health for men.

inclusion. Those studies looked at 42 different levels of impact among 1,774 men in 21 different study populations.

Men who were more highly exposed to the pesticides, such as those who work in agriculture, had significantly less sperm concentration than men who had the least exposure to organophosphates and N-methyl carbamates. Animal studies have shed light on how these pesticides may impact sperm. They appear to directly interfere with sexual hormones, damage cells in the testes, and alter neurotransmitters in the brain that impact sperm production, the study said.

Sperm is an incredibly sensitive endpoint

when it comes to overall health for men. One should be aware of insecticides in one's environment and to recognize that avoiding unnecessary insecticide exposure is a good thing,

especially if you're planning on a family and wanting to conceive children. Action to reduce insecticide exposure is needed, so that if men want to father children, they're going to be able to do so without being concerned about overall reductions in sperm concentration.

This comprehensive investigation found sufficient evidence of an association between higher OP and NMC insecticide exposure and lower sperm concentration in adults. Although additional cohort studies can be beneficial to fill data gaps, the strength of evidence warrants reducing exposure to OP and NMC insecticides now to prevent continued male reproductive harm.

Adult Organophosphate and Carbamate Insecticide Exposure and Sperm Concentration: A Systematic Review and Meta-Analysis of the Epidemiological Evidence.

Ellis et al Environmental Health Perspectives 2023.



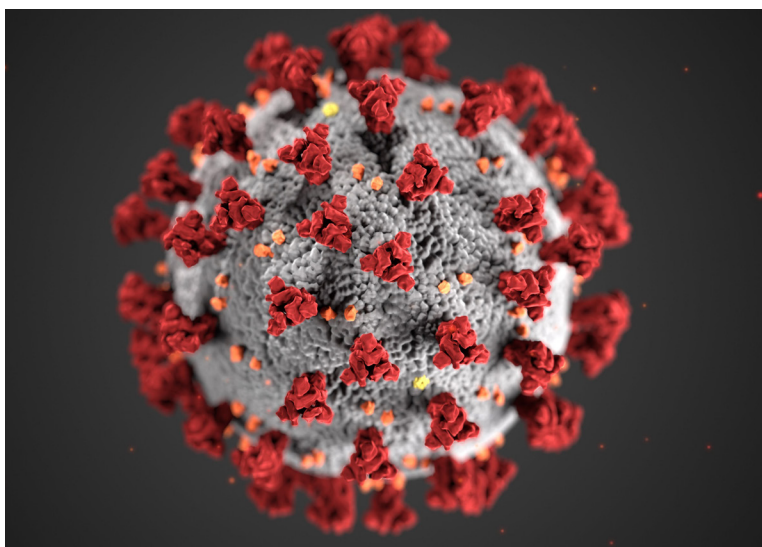
Covid-19's effect on sperm

Many people who recover from COVID-19 experience long-term symptoms, such as brain fog or heart problems.

Increasing evidence suggests that the virus can also impair fertility. Now, researchers reporting in American chemical society (ACS) have analysed protein levels in semen of men who have recovered from COVID-19. The pilot study suggests that even mild or moderate illness could change the levels of proteins related to male reproductive function, the researchers say.

Although SARS-CoV-2 mainly affects the respiratory system, the virus – and the body's response to it – also damages other tissues. Recent evidence indicates that COVID-19 infection can reduce male fertility, and the virus has been detected in male reproductive organs.

Firuza Parikh and Rajesh Parikh at Jaslok Hospital, Sanjeeva Srivastava at the Indian Institute of Technology and colleagues wondered if COVID-19 infection could have long-term impacts on the male reproductive system. To find out, they decided to compare



levels of proteins in the semen of healthy men and those who previously had mild or moderate cases of COVID-19.

The researchers analysed semen samples from 10 healthy men and 17 men who had recently recovered from COVID-19. None of the men, who ranged in age from 20 to 45, had a prior history of infertility. The team found that the recovered men had significantly reduced sperm count and motility, and fewer normally shaped sperm, than men who hadn't had COVID-19. When the

researchers analysed semen proteins using liquid chromatography-tandem mass spectrometry, they found 27 proteins at higher levels and 21 proteins at lower levels in COVID-19-recovered men compared with the control group. Many of the proteins were involved in reproductive function. Two of the fertility-related proteins, semenogelin 1 and prosaposin, were present at less than half their levels in the semen of the COVID-19-recovered group than in the semen of controls. These findings suggest that SARS-CoV-2 has direct or indirect effects on male reproductive health

that linger after recovery, the researchers say. However, they note that larger studies should be done to confirm these findings, and a control group of men who recently recovered from other flu-like illnesses should be included to ensure that the findings are specific for COVID-19.

The American Chemical Society (ACS) is a nonprofit organization chartered by the U.S. Congress.

Why is Phenol red absent from Nidacon products?

Phenol red is commonly incorporated into various culture media to visually monitor changes in medium pH, offering insights into factors such as media age or incubator function rather than playing a direct role in embryo development (Swain, 2015).

However, the addition of phenol red poses hypothetical risks, potentially stemming from its estrogenic activity (Moreno-Cuevas and Sirbasku, 2000) or its potential as a source of reactive oxygen species (ROS) (Nakayama et al., 1994). Importantly, neither of these concerns has been conclusively proven to impact embryo



culture or any other procedures within an IVF lab where Phenol red might be used.

Despite the absence of concrete evidence, the cautious approach prevails, as the perceived risks associated with Phenol red outweigh any potential benefits. In the current era of microdrop culture, where media volumes are typically less than 100 µl, the inclusion of a color indicator becomes less necessary and even potentially counterproductive. Visual assessment of color changes in such minuscule volumes proves challenging to standardize effectively.

With a commitment to optimizing laboratory practices and ensuring the utmost safety for embryo culture, Nidacon has made a deliberate choice to exclude Phenol red from all its media formulations. This decision reflects a proactive stance in

line with contemporary best practices in IVF laboratories, where precision and reliability are paramount in the pursuit of successful outcomes.

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Moreno-Cuevas, Sirbasku Estrogen mitogenic action.III. Is phenol red a "redherring"? InVitroCellDevBiolAnim2000; 36(7):447-464

Nakayama. Effects of visible light and other environmental factors on the production of oxygen radicals by hamster embryos. Theriogenology 1994;41(2): 499-510

Swain J, Optimal Human Embryo Culture, Issue Theme Best Practices in In Vitro Fertilization; Guest Editor, Bradley 2015

Mobile phone use may affect semen quality

Does electromagnetic radiation emitted by mobile phones affect semen quality?

While various environmental and lifestyle factors have been proposed to explain the decline in semen quality observed over the last fifty years, the role of mobile phones has yet to be demonstrated. A team from the University of Geneva (UNIGE), in collaboration with the Swiss Tropical and Public Health Institute (Swiss TPH), has published a major cross-sectional study on the subject.

Many studies have shown that semen quality has decreased over the last fifty years. Sperm count is reported to have dropped from an average of 99 million sperm per millilitre to 47 million per millilitre. This phenomenon is thought to be the result of a combination of environmental factors (endocrine disruptors, pesticides, radiation) and lifestyle habits (diet, alcohol, stress, smoking).

The group from Switzerland studied the association between semen parameters of 2886

men and their use of mobile phones. Men completed a detailed questionnaire related to their lifestyle habits, their general health status and more specifically the frequency at which they used their phones, as well as where they placed it when not in use.

These data revealed an association between frequent use and lower sperm concentration. The median sperm concentration was significantly higher in the group of men who did

not use their phone more than once a week (56.5 million/mL) compared with men who used their phone more than 20 times a day (44.5 million/mL). This difference corresponds to a 21% decrease in

sperm concentration for frequent users (>20 times/day) compared to rare users (<1time>).

Data analysis also seems to show that the position of the phone – for example, in a trouser pocket – was not associated with lower semen parameters. However, the number of people in this cohort indicating that they did not carry their phone close to their body was too small to draw a really robust conclusion on this specific point.

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Conclusion

This large population-based study suggests that higher mobile phone use is associated with lower sperm concentration and total count. The observed time trend of decreasing association is in line with the transition to new technologies and the corresponding decrease in mobile phone output power. Prospective studies with improved exposure assessment are needed to confirm whether the observed associations are causal.

Association between self-reported mobile phone use and the semen quality of young men.

Rahban et al Fertility & Sterility 2023.

Anti-inflammatory diets in fertility: An evidence review



With an emphasis on fruits, vegetables and legumes, the Mediterranean diet has long been applauded for its multiple health benefits.

Now, new research shows that it may also help overcome infertility, making it a non-intrusive and affordable strategy for couples trying to conceive. Conducted by Monash

University, the University of the Sunshine Coast, and the University of South Australia, the review found that the Mediterranean diet can improve fertility, assisted reproductive technology (ART) success, and sperm quality in men. Specifically, researchers identified that the anti-inflammatory properties of a Mediterranean diet can improve couples' chances of conception.

Infertility is a global health concern affecting 48 million couples and 186 million individuals worldwide. Infertility creates a significant economic and social burden for couples who wish to conceive and has been associated with suboptimal lifestyle factors, including poor diet and physical inactivity. Modifying preconception nutrition to better adhere with Food-Based Dietary Guidelines (FBDGs) is a non-invasive and potentially effective means for improving fertility outcomes. While several dietary patterns have been associated with fertility outcomes, the mechanistic links between diet and infertility remain unclear.

A key mechanism outlined in the literature relates to the adverse effects of inflammation on fertility, potentially contributing to irregular menstrual cyclicity, implantation failure, and other negative reproductive sequelae. Therefore, dietary interventions which act to reduce inflammation may improve fertility outcomes.

This review consistently shows that adherence to anti-inflammatory diets such as the Mediterranean diet (specifically, increased intake of monounsaturated and n-3 polyunsaturated fatty acids, flavonoids, and reduced intake of red and processed meat) improves fertility, assisted reproductive technology (ART) success, and sperm quality in men.

Therefore, integration of anti-inflammatory dietary patterns as low-risk adjunctive fertility treatments may improve fertility partially or fully and reduce the need for prolonged or intensive pharmacological or surgical interventions.

Anti-Inflammatory Diets in Fertility: An Evidence Review Alesi et al Nutrients 2022.

Nidacon is closed
25 December – 1 January

**We wish you happy holidays
and a wonderful new year!**



Coming up

■ Swedish Society for Reproductive Medicine

Annual meeting in Stockholm, Sweden, April 18-19 2024

SSRM

Svenska Sällskapet för
Reproduktionsmedicin
Swedish Society for Reproductive Medicine



■ The Nordic IVF Laboratory Society (NILS)

20th Meeting in Copenhagen, May 3rd-4th, 2024



NILS

Nordic IVF Laboratory Society

■ ALPHA 14 th biennial conference

Lisbon, Portugal, 30 May-02 June 2024



ALPHA
SCIENTISTS IN REPRODUCTIVE MEDICINE

**14th BIENNIAL ALPHA
CONFERENCE**
30 May - 02 June 2024 • EPIC SANA HOTEL
Lisbon, Portugal



► Who to contact



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