# Sperm DNA Research Hub

Cutting-edge research on sperm DNA fragmentation, recurrent pregnancy loss, and male fertility — curated by Examen Lab.

19 Research Categories

200+ Peer-Reviewed Papers

Sperm DNA Fragmentation Testing

Explore Research

Sperm DNA Damage

FEATURED STUDY

# Double-Stranded Sperm DNA Fragmentation & Recurrent Pregnancy Loss

A landmark prospective cohort study examining the role of male factor DNA damage in couples experiencing recurrent miscarriage.

Prospective Cohort Study

100 Men from RPL Clinic vs. Sperm Donors

Double-Stranded DNA Fragmentation Focus

# Research Question

> **Do men attending a recurrent miscarriage clinic have high double-stranded sperm DNA damage compared with a sperm donor population?**

## The Female Focus Problem

Historically, RPL investigation has focused predominantly on the female partner, leaving the male factor underexplored.

## The Male Factor Question

This study places double-stranded sperm DNA fragmentation (dsSDF) under rigorous scientific scrutiny as a measurable contributor to recurrent miscarriage outcomes.

# Study Design

A prospective cohort study comparing sperm DNA fragmentation in men from a recurrent miscarriage clinic against proven-fertile sperm donors.

## Study Type

Prospective cohort study with robust participant selection and standardised testing protocols.

## 100 Men

Male partners attending a recurrent miscarriage clinic, representing the study group under investigation.

## 81 Sperm Donors

Donors from a European sperm bank with proven fertility, serving as the control population.

## Dual Assay Testing

All samples evaluated using both the alkaline Exact comet assay and the neutral Extend comet assay.

# The Two Comet Assays Explained

Two distinct assays were used to measure different types of sperm DNA damage — each revealing a different dimension of fragmentation.

ALKALINE ASSAY

## Exact Comet Assay

The **alkaline (Exact) comet assay** identifies **global sperm DNA damage** — measuring both single-strand and double-strand DNA breaks. This provides a comprehensive overview of total DNA fragmentation present within the sperm sample.

Measures: Single + Double Strand Damage (Global SDF)

NEUTRAL ASSAY

## Extend Comet Assay

The **neutral (Extend) comet assay** (patent pending) measures **only double-stranded sperm DNA fragmentation (dsSDF)**. This targeted measurement isolates the most clinically significant form of DNA damage, which is less amenable to repair by the egg.

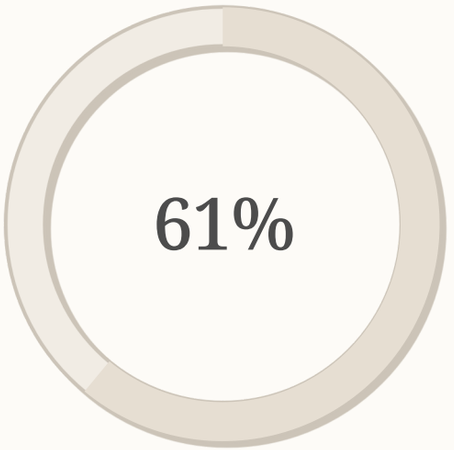
Measures: Double Strand Damage Only (dsSDF)

# Key Results

Among 100 men attending a recurrent miscarriage clinic, sperm DNA testing revealed striking findings invisible to standard semen analysis.

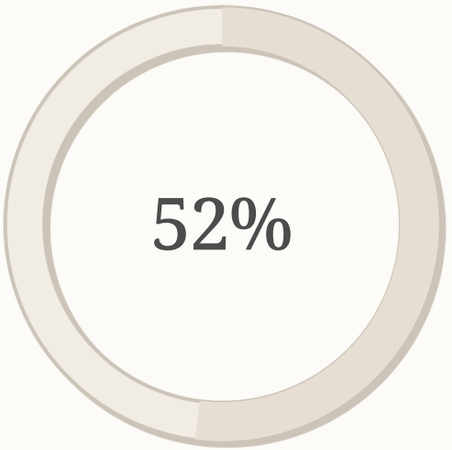

### Normal Semen Analysis

Men classified as within normal semen parameters — yet still showing elevated DNA damage.




### Raised Global SDF

Of men with normal semen analysis, 61% had raised global sperm DNA fragmentation.




### Raised dsSDF

Over half of men with normal semen analysis had raised double-stranded DNA fragmentation.

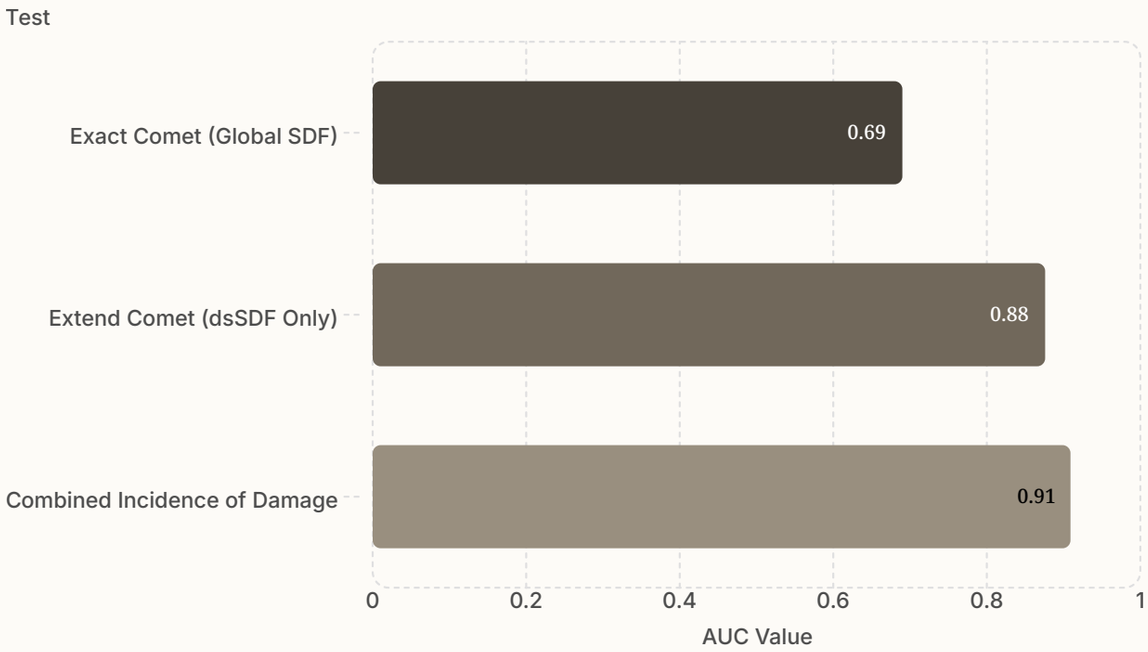
⚠ Standard semen analysis alone would have missed significant DNA damage in the majority of these men.

# Diagnostic Performance: Area Under the Curve

The AUC (Area Under the Curve) measures how well each test distinguishes between men with recurrent miscarriage and fertile sperm donors. A value of 1.0 is perfect; 0.5 is no better than chance.

Extend Comet (dsSDF): AUC 0.876 — dramatically outperformed the global SDF test (AUC 0.690).

Combined Incidence of Damage: AUC 0.909 — exceptional diagnostic accuracy for identifying male-factor RPL contributions.




# Conclusions

> This study of male factor sperm DNA fragmentation in a large cohort of men attending a recurrent miscarriage clinic — where they are rarely the focus of clinical investigation — demonstrates a **strong association between double-stranded sperm DNA fragmentation and male factor-driven miscarriage contribution**.

### Standard Semen Analysis Is Insufficient

Normal semen parameters do not rule out significant DNA damage in men from RPL couples.

### dsSDF Is the Critical Marker

Double-stranded DNA fragmentation is more strongly associated with RPL than global SDF measures.

### Male Testing Is Essential

Men should be routinely investigated as part of the recurrent pregnancy loss clinical pathway.

The Extend neutral comet assay offers superior diagnostic accuracy for identifying male-factor RPL contributions over standard semen analysis alone.

# Research Categories

Explore the full breadth of Examen Lab's curated research library, spanning fertility, lifestyle, assisted reproduction, and beyond.

## Antioxidants and ART

16 Research Papers exploring whether antioxidant supplementation improves assisted reproductive technology success rates.

## Cancers and Sperm DNA

3 Research Papers examining the relationship between cancer diagnoses, treatments, and sperm DNA integrity.

## Comparison of Sperm DNA Tests

6 Research Papers comparing the clinical utility and accuracy of different sperm DNA fragmentation testing methods.

## Dad's Age

2 Research Papers on how paternal age and lifestyle affect the health outcomes of children born via ART.

RESEARCH CATEGORIES

# More Research Categories

Six further categories spanning ART outcomes, lifestyle, infertility, and emerging reproductive science.

## DNA Damage Impairs ART

8 Research Papers on how sperm DNA damage negatively impacts assisted reproductive technology outcomes.

## IMSI

6 Research Papers on intracytoplasmic morphologically selected sperm injection and its clinical applications.

## Eggs Repair Sperm

5 Research Papers investigating the oocyte's capacity to repair damaged sperm DNA after fertilisation.

## Infertility

13 Research Papers covering the broad landscape of male and female infertility causes and treatments.

## Idiopathic Infertility Explained

2 Research Papers revealing sperm DNA damage as a hidden cause behind unexplained infertility diagnoses.

## Lifestyle Hazards

66 Research Papers — the largest category — documenting how lifestyle factors damage sperm DNA and fertility.

# Men, Miscarriage & More

Research placing the male factor at the centre of reproductive outcomes — from miscarriage to long-term health.

## Men and Miscarriage

9 Research Papers on the male contribution to recurrent pregnancy loss through sperm DNA damage.

## Repeated IVF

2 Research Papers examining why IVF success rates diminish with repeated cycles and the male factor role.

## Semen Analysis Limitations

10 Research Papers demonstrating the significant limitations of standard semen analysis as a fertility diagnostic tool.

## Sperm and Later Onset Disease

7 Research Papers exploring sperm quality as a biomarker for predicting later-onset systemic disease in men.

# Specialist & Clinical Research Areas

Specialist-focused research spanning DNA testing methodology, clinical protocols, and advanced reproductive interventions.

## Sperm DNA Damage

27 Research Papers — a comprehensive collection covering mechanisms, measurement, and clinical significance of sperm DNA fragmentation.

## Sperm Safe Drugs

3 Research Papers identifying medications that are safe for sperm DNA integrity during fertility treatment cycles.

## SpermComet Key Papers

11 Research Papers representing the foundational and most impactful publications underpinning the SpermComet technology.

## Testicular Sperm and ICSI

6 Research Papers on using testicular sperm extraction to overcome repeated ICSI failures linked to DNA damage.

## Urological Input

5 Research Papers making the case for urological assessment as a standard component of male fertility investigation.

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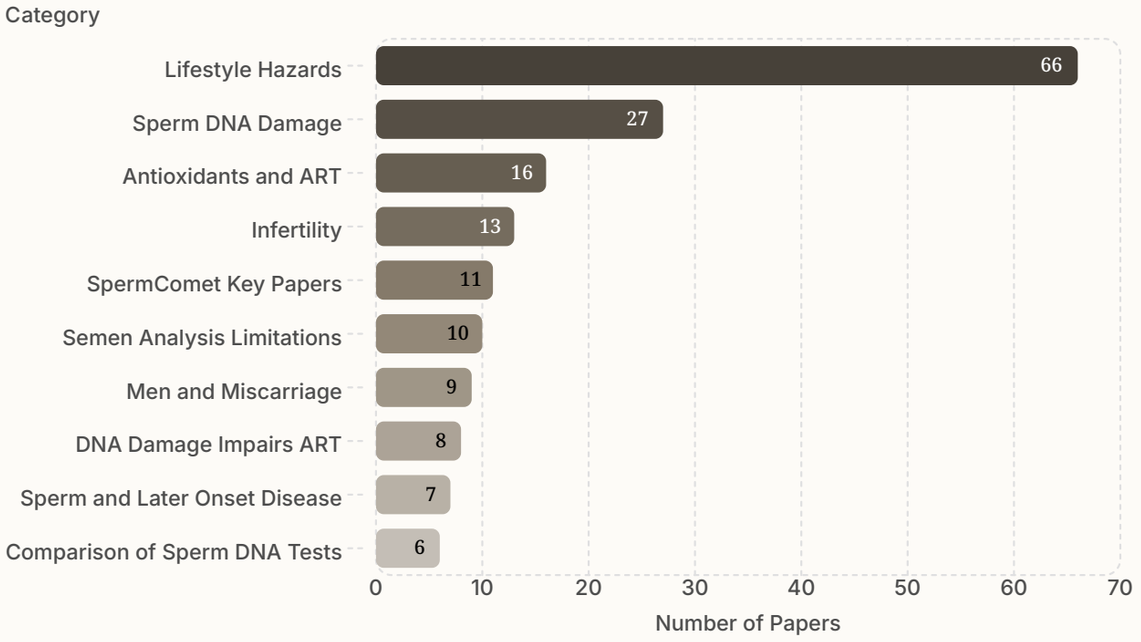
# Research Library at a Glance

The Examen Lab research library spans 19 categories and hundreds of peer-reviewed papers, providing the evidence base for advanced sperm DNA testing in clinical practice.

**19**
Research Categories

**200+**
Peer-Reviewed Papers

**66**
Papers in the Largest Category (Lifestyle Hazards)




> Lifestyle hazards represent the single largest research category with 66 papers, underscoring the profound impact of environmental and behavioural factors on sperm DNA integrity and male fertility.

WHY SPERM DNA TESTING CHANGES EVERYTHING

# Why Sperm DNA Testing Changes Everything

### Standard Semen Analysis Misses Critical Damage

As demonstrated in this study, 66% of men with normal semen parameters still had raised global SDF, and 52% had raised dsSDF — invisible to conventional testing.

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### Double-Stranded Breaks Are Most Clinically Significant

Unlike single-strand breaks, double-stranded DNA fragmentation cannot be repaired by the egg, making it a more reliable predictor of reproductive failure.

### Male Investigation Must Be Routine in RPL

Men attending recurrent miscarriage clinics are rarely the focus of investigation. This research provides compelling evidence that this must change.

# Explore the Full Research Library

Access all research papers, organised by clinical category, at the Examen Lab research hub.

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### Browse All Papers

Access the complete library of peer-reviewed research supporting sperm DNA fragmentation testing.

### Filter by Category

Navigate 19 specialist categories from lifestyle hazards to testicular sperm and ICSI outcomes.

### Examen Lab Assays

Learn about the Exact and Extend comet assays underpinning the research and clinical testing services.

View All Research Papers | Sperm DNA Damage Research