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JOURNAL ARTICLE CORRECTED PROOF

## Exploring the reproductive toxicity and mechanism analysis of perfluorooctanoic acid and perfluorononanoic acid based on network toxicology, molecular docking, and experimental validation [Get access >](#)

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### Abstract

This study combined network toxicology, molecular docking, and animal experiments to systematically investigate the reproductive toxicity and potential mechanisms of perfluorooctanoic acid (PFOA) and perfluorononanoic acid (PFNA). In total, 173 and 151 male infertility-related targets were identified for PFOA and PFNA, respectively, with key targets including *AKT1*, *ESR1*, *EGFR*, and *HSP90AA1*. Kyoto Encyclopedia of Genes and Genomes enrichment analysis revealed significant involvement of pathways such as phosphoinositide 3-kinase (PI3K)–protein kinase B (AKT), mitogen-activated protein kinase, and forkhead box O. Molecular docking predicted favorable binding affinities (all binding energies less than  $-7$  kcal/mol) between each compound and the core targets, suggesting potential biological relevance. Because PFOA and PFNA share structural similarity and overlapping target profiles,