CHEMWATCH

Bulletin Board

Contents

FEB. 13, 2026

(click on page numbers for links)

CONTACT US

subscribers@chemwatch.net
tel +61 3 9572 4700
fax +61 3 9572 4777

1227 Glen Huntly Rd
Glen Huntly
Victoria 3163 Australia

CHEMICAL EFFECTS

Association of exposure to personal care product chemicals with maternal thyroid health: a prospective cohort study integrated with targeted risk assessment for environmental chemicals strategy

2026-02-02

Widely used personal care product (PCP) chemicals can disrupt the function of thyroid hormones. Pregnancy-induced vulnerability heightens the risk of PCPs on maternal thyroid health, but their individual, joint, and longitudinal impacts have been underexplored. Moreover, the risk assessment regarding maternal thyroid-impairing effects of PCPs has been lacking from epidemiological and mechanistic insights. In this study, we conducted an integrated risk assessment of PCPs on maternal thyroid functions, synthesizing evidence from 47 epidemiological, 18 in vivo, and 19 in vitro evidences from four major databases. Besides, a separate cohort analysis was prospectively performed among 803 pregnant women to explore associations between real-world PCP exposure and thyroid function. Serum samples in the second trimester (T2) were analyzed for PCP profiles by liquid chromatography-tandem mass spectrometry (LC-MS/MS). Anti-thyroid peroxidase antibodies (ATPO), thyroid stimulating hormone (TSH), and free thyroxine (FT4) during T2 and the third trimester (T3) were measured using immunoassays. The targeted risk assessment of environmental chemicals (TRAEC) strategy yielded a middle-level risk score of 5.01 for PCPs, with category-specific scores of 5.47 for phthalates, 4.85 for per- and polyfluoroalkyl substances (PFASs), and 4.12 for bisphenols. The cohort results revealed significant associations between bisphenol S (BPS), monobutyl phthalate (MEHP), dimethyl phthalate (DMP), di-n-pentyl phthalate (DnPP), dicyclohexyl phthalate (DCHP) , Sodium perfluoro-1-octanesulfonate (L-PFOS), and perfluoro-n-undecanoic acid (PFUdA) with thyroid function markers during T2 and T3. Mixed-exposure models showed negative associations of PCPs with TSH during T2, with PFUdA, DMP, DCHP, and BPS identified as key contributors. These findings highlighted the potential risk of PCP exposure as determined by the TRAEC strategy. In conclusion, PCP exposure may contribute to maternal thyroid dysfunction with trimester-specific effects.

CHEMWATCH
Bulletin Board
Technical
FEB. 13, 2026

Our findings highlighted the need to mitigate PCP-related exposures during pregnancy and improve maternal thyroid health.

Authors: Mazhar Sultan, Ziye Xia, Feng Zhu, Jiali Chen, Chao Dong, Qiurun Yu, Farah Kafauit, Salimata Yakubu, Xuan Ma, Natasha Chitakwa, Aizhen Wang, Quanquan Guan, Yankai Xia

Full Source: Environment international 2026 Feb 2:208:110121. doi: 10.1016/j.envint.2026.110121.

Heavy and trace metals toxicity implications in the breakdown of cellular homeostasis: A risk factor for rheumatoid arthritis pathogenesis

2026-02-05

Occupational and environmental exposure to heavy and trace metals is increasingly implicated in cellular dysfunction underlying the pathogenesis of rheumatoid arthritis (RA). While trace metals such as selenium (Se), zinc (Zn), and copper (Cu) are essential for the regulation of immune and inflammatory responses, excessive or imbalanced exposure can disrupt physiological homeostasis. In contrast, exposure to heavy metals including lead (Pb), mercury (Hg), cadmium (Cd), and nickel (Ni) poses significant risks to joint health and has been increasingly associated with progressive joint tissue deterioration. Accumulating evidence indicates that metal-induced toxicity disrupts cellular homeostasis by promoting reactive oxygen species (ROS)-mediated oxidative stress and impairing key cellular processes, including apoptosis, ferroptosis, mitochondrial dysfunction, and endoplasmic reticulum (ER) stress. Moreover, heavy metals may interfere with the autophagy-lysosomal pathway, a critical mechanism for maintaining cellular integrity and immune balance. This review underscores the importance of understanding the complex interactions between heavy and trace metal exposure and their roles in cellular dysfunction and joint tissue degeneration. Elucidating the molecular mechanisms underlying metal-induced toxicity is essential for the development of targeted therapeutic strategies and effective preventive interventions aimed at mitigating RA progression.

Authors: Nemat Ali, Ali M Alaseem, Md Meraj Ansari, Shambhu Kumar, Mohammad Suhail Akhter, Mohammad Fareed, Prawez Alam, Glowi Alasiri

Full Source: Autoimmunity reviews 2026 Feb 5:104003. doi: 10.1016/j.autrev.2026.104003.

Differential Toxicity of Perfluorooctane Sulfonate (PFOS) in Wild-Type and Oatp1d1 Mutant Zebrafish Larvae

2026-02-06

Perfluorooctane sulfonate (PFOS) is a persistent and bioaccumulative member of the per- and polyfluoroalkyl substances (PFAS) family widely used in various industrial applications and consumer products. In this study we present a comprehensive analysis of the effects of PFOS exposure on zebrafish embryos with respect to possible role of the organic anion transporting polypeptide 1d1 (Oatp1d1) membrane transporter, focusing on the differential responses between wild-type (WT) and Oatp1d1 mutant embryos. Significant differences in mortality rates were observed, with LC50 values of 23.57 μM for WT and 16.71 μM for oatp1d1 mutants, indicating a higher susceptibility of the mutants to PFOS toxicity. Developmental abnormalities, particularly in the swim bladder, were more pronounced in mutant embryos. In addition, gene expression analysis showed changes in expression of genes involved in biotransformation processes, including members of the cytochrome P450 and glutathione S-transferase families. In summary, results of this study emphasize the complexity of PFOS-induced developmental toxicity mechanisms, implying important protective role of the Oatp1d1 transporter possibly related to detoxification processes or regulation of bioavailability. The findings improve our understanding of the toxicokinetic and toxicodynamic mechanisms of PFOS, emphasizing potential need for additional regulatory measures to address PFOS contamination and protect both aquatic life and human populations.

Authors: Lana Vujica, Jelena Dragojević, Jovica Lončar, Cecile Otten, Marin Kutnjak, Sanja Babić, Ivan Mihaljevic, Tvrtko Smital

Full Source: Chemico-biological interactions 2026 Feb 6:111955. doi: 10.1016/j.cbi.2026.111955.

ENVIRONMENTAL RESEARCH

Monsoon-driven nutrient pollution assessment and source tracking in tropical mountain headwaters using positive matrix factorisation

2026-02-06

Tropical mountain ecosystems, driven by monsoonal hydrology and escalating land use, are highly vulnerable to nutrient enrichment, which threatens downstream water quality. This study investigates the spatiotemporal variability and quantitative source apportionment of

CHEMWATCH
Bulletin Board
Technical
FEB. 13, 2026

dissolved inorganic nitrogen (DIN), phosphorus (DIP), and silica (DSi) across surface water and groundwater in the Munnar Critical Zone Observatory (CZO), Western Ghats, India. Seasonal monitoring over three monsoon cycles revealed extremely elevated DIN/DIP ratios (up to 299:1), indicating severe phosphorus (P) limitation, reflecting rapid particulate P flushing combined with sustained anthropogenic nitrogen (N) inputs. This N enrichment contributes to a significant riverine DIN flux (3.79 × 103 tons/year), dominating catchment-scale transport. Hydrological analysis confirmed agricultural leaching, with nitrate (NO3-N) peaking in groundwater during the monsoon (6.98 ± 0.63 mg/L), while silicate weathering significantly enriched groundwater DSi (15.22 ± 2.81 mg/L). The Positive Matrix Factorisation (PMF) model apportioned 70.2% of NO3-N and 81.3% of phosphate (PO43-) to agricultural fertiliser inputs and 100% of NO2-N plus 99.2% of ammonium (NH4-N) to sewage waste; seasonally, fertiliser signals surged during the monsoon, while sewage contributions peaked in the post-monsoon baseflow. Distinct nitrogen cycling pathways were confirmed by the NO3-N/NH4-N ratios (16:1 in surface water vs. 10:1 in groundwater), signifying N loss via denitrification in septic-influenced anaerobic groundwater. These findings, underscoring significant N* excess (up to 107.35), quantify the high eutrophication potential being exported from this anthropogenically stressed headwater system. These results highlight urgent management needs, including optimised fertiliser application timing, restoring riparian buffers, and upgrading sanitation systems to curb nutrient pollution and safeguard downstream ecosystem services.

Authors: Sreelesh Raghunath, Utpal Majee, Asha Rani Gopalakrishnan Vijayakumari, Sreelash Krishnan, Maya Kesavan

Full Source: Environmental monitoring and assessment 2026 Feb 6;198(2):211. doi: 10.1007/s10661-026-15025-6.

PHARMACEUTICAL/TOXICOLOGY

Early childhood blood lead concentrations and selective attention among school-age children: Evidence consistent with a causal association and effect modification by sleep duration

2026-02-06

Selective attention is essential for cognitive and behavioral self-regulation. However, the association between lead exposure and selective attention remains unclear. We examined the association between blood lead

levels and selective attention, and evaluated whether this association is influenced by sleep duration. We used data from a prospective cohort of 377 Korean children. Blood lead concentrations and Stroop Color and Word Test (SCWT) scores were repeatedly measured at 6, 8, and 10 years of age. Generalized propensity scores (GPSs) were generated using linear regression models predicting lead levels. Associations between lead levels and SCWT scores were assessed using causal inference approaches, such as linear mixed models adjusted for both GPS and potential confounders, as well as doubly robust estimation models. In models adjusted for both GPS and potential confounders, a doubling of lead levels was associated with lower color [β = -1.46, 95 % confidence interval (CI): -2.63, -0.30] and color-word (β = -1.52, 95 % CI: -3.00, -0.04) test scores. In doubly robust models, these associations persisted for the color (β = -1.35, 95 % CI: -2.36, -0.34) and color-word (β = -1.33, 95 % CI: -2.61, -0.04) test scores. The associations varied by sleep duration, with stronger effects observed among children sleeping ≤ 8 h compared with those sleeping longer. By applying multiple causal inference approaches, this study provides robust evidence that lead exposure impairs selective attention in school-age children. The detrimental associations were amplified among those sleeping ≤ 8 h, suggesting that sufficient sleep may mitigate the neurotoxic effects of lead exposure.

Authors: Heeseon Jang, Choong Ho Shin, Young Ah Lee, Yun Jeong Lee, Youn-Hee Lim, Yun-Chul Hong, Bung-Nyun Kim, Dong-Wook Lee, Johanna Inhyang Kim, Kyoung-Nam Kim

Full Source: Ecotoxicology and environmental safety 2026 Feb 6:311:119845. doi: 10.1016/j.ecoenv.2026.119845.

Kidney cancer and occupational agricultural exposures in the AGRIculture and CANcer cohort

2026-01-02

Introduction: The relationship between kidney cancer and occupational exposures, especially agricultural, has been understudied. This study aimed to assess the risk of kidney cancer with a wide range of agricultural activities and tasks.

Methods: Participants from the French AGRIculture and CANcer cohort (≈180 000) were included. Incident kidney cancers (n = 654) were identified through cancer registries from 2005-2007 until 31 December 2017. Occupational exposures and potential confounders were identified by using enrollment questionnaires covering 5 livestock types, 13 crops, and related tasks. Cox models with age as the timescale were applied separately for men and women, using non-exposed farmers as the

CHEMWATCH
Bulletin Board
Technical
FEB. 13, 2026

reference to account for genetic and agricultural exposure differences, along with exposure-response and sensitivity analyses.

Results: In men, positive associations were found between kidney cancer risk and working with rapeseed [hazard ratio (HR) = 1.26 (0.95-1.68)] and sunflowers [HR = 1.23 (0.89-1.68)], and tasks related to other crops such as corn, wheat/barley, beet, and tobacco. In women, an increased risk was noted for winegrowers [HR = 1.56 (1.12-2.18)]. Pesticide use (on fields and/or seeds) was associated, for both sexes, with these crops, showing exposure-response relationships with crop area and work duration. Conversely, some inverse associations were observed for livestock breeding, notably cattle in men and poultry in women.

Conclusion: We reported positive associations between kidney cancer risk and specific field crops, tobacco, and vineyards, with gender differences in pesticide-related tasks. Further studies are needed to understand these differences and identify substances linked to kidney cancer.

Authors: Carine Nassar, Mathilde Boulanger, Isabelle Baldi, Séverine Tual, Simona Bara, Pierre Lebailly, Bénédicte Clin, AGRICAN group, Arnaud Alvès, Patrick Arveux, Simona Bara, Anne-Marie Bouvier, Gaëlle Coureau, Patricia Delafosse, Pascale Grosclaude, Bénédicte Lapotre-Ledoux, Emilie Marrer, Marc Maynadié, Florence Molinié, Alain Monnereau, Xavier Troussard, Michel Velten, Nicolas Vigneron, Anne-Sophie Woronoff

Full Source: International journal of epidemiology 2026 Jan 2;55(1):dyag001. doi: 10.1093/ije/dyag001.

Per- and polyfluoroalkyl substances in waters associated with oil and gas development in the Denver Basin

2026-02-07

Use of per- and polyfluoroalkyl substances (PFAS) in the petroleum industry could be a cause for concern due to the large volumes of produced water (PW) generated during oil and gas extraction, the reuse of these wastes in water-stressed regions, and adverse health outcomes related to PFAS exposures. However, PW PFAS characterization is nearly absent in the literature, and hydraulic fracturing (HF) chemical disclosures often omit the identities of additives as proprietary. Here we evaluate PFAS in PW samples from three petroleum wells in the Denver Basin during their first year of production. Total concentrations of targeted PFAS (Σ40PFAS) were < 35 ng/L in PW samples, with short-chain PFAS like perfluorobutanoic acid persisting throughout the sampled duration. Analysis of freshwater inputs for hydraulic fracturing (Σ40PFAS ~ 113 ng/L) and mixed fracture fluid (Σ40PFAS ~ 69 ng/L) indicated much of the targeted PFAS content was derived from the input water, and not

from HF additives, however samples subjected to oxidation indicated the presence of PFAS precursors that would not be detected by targeted analysis. This study highlights that while PFAS content is low in the studied PWs, the potential for redistribution of PFAS in the environment may be a consideration for reuse applications.
Authors: Matthew S Varonka, Aaron M Jubb, Bonnie McDevitt, Jenna L Shelton, Elliott P Barnhart, Denise M Akob, Isabelle M Cozzarelli
Full Source: Scientific reports 2026 Feb 7. doi: 10.1038/s41598-025-33394-9.

OCCUPATIONAL

Multimetal Exposure and its Association with Neutrophil Extracellular Traps (NETs) Markers and Prothrombotic Biomarkers in Occupational Groups

2026-02-04
This study evaluated the association between multimetal exposure and neutrophil extracellular traps (NETs) and prothrombotic biomarkers in quarry workers, brickyard makers, and waste recyclers. A cross-sectional study was conducted in 91 adults. Urinary concentrations of seven metals and serum NETs and prothrombotic markers were quantified. Correlation analysis and PCA were used to identify exposure-response patterns. Waste recyclers had the highest Al and Hg levels, while brick makers showed the highest As and Zn concentrations. NETs biomarkers varied across scenario: neutrophil elastase (NE) and citrullinated histone (H3Cit) were elevated in brick makers, whereas circulating DNA was highest in quarry workers. PCA indicated that Cr-Ni-Al exposure aligned with NETs component scores, and correlations showed positive associations of Hg and As with NE, H3Cit, and myeloperoxidase (MPO). Higher As, Hg, and Zn were also associated with elevated platelets and D-dimer. Overall, multimetal exposure modulated NETs activity and early prothrombotic response.
Authors: Ana Karen González Palomo, Juan Diego Cortés García, Kelvin Saldaña Villanueva, José de Jesús Mejía Saavedra, Fernando Díaz Barriga, Francisco Javier Pérez Vázquez
Full Source: Environmental toxicology and pharmacology 2026 Feb 4:104955. doi: 10.1016/j.etap.2026.104955.

CHEMWATCH
Bulletin Board
Technical
FEB. 13, 2026

Association and biological pathways between lifetime occupational exposure to workplace hazards and incident chronic obstructive pulmonary disease and cardiovascular disease in middle-aged and older adults

2026-01-21
The long-term impact of lifetime occupational exposure (LOE) on chronic obstructive pulmonary disease (COPD) and cardiovascular disease (CVD) risk remains unclear. This study examined associations between LOE and the risks of COPD and CVD in middle-aged and older adults. A prospective cohort study was conducted using UK Biobank data, including demographic, lifestyle, and genetic information. Cox proportional hazard models assessed associations of one-hazard (OLOE) and total-hazards LOE (TLOE) with cardiopulmonary outcomes. Mediation analyses explored the role of biomarkers and metabolites. Over a median 12.5-year follow-up, 2.4 % (2426/103,176) developed COPD and 20.6 % (18,035/87,419) developed CVD. All OLOEs, except pesticide, were associated with elevated risks for both diseases. Higher TLOE was linked to increased COPD (HR: 1.21, 95 % CI: 1.15-1.26) and CVD (HR: 1.05, 95 % CI: 1.03-1.06) risks per exposure level increase. Clear dose-response relationships were observed. Inflammatory markers, such as white blood cell count, neutrophil count, and C-reactive protein, partially mediated these associations. Moreover, TLOE was significantly associated with the onset of a single cardiopulmonary disease and its progression to comorbidity. Our findings underscored the potential long-term cardiopulmonary burden of occupational hazards and supported the need for workplace hazard reduction to promote healthy aging.
Authors: Yang Yang, Qichen Liu, Filippos T Filippidis, Peng Lu, Yuming Guo
Full Source: Journal of hazardous materials 2026 Jan 21:504:141188. doi: 10.1016/j.jhazmat.2026.141188.

Increased risks of systemic and abdominal obesity associated with long-term exposure to PM2.5 constituents

2026-02-06
Nexus between PM2.5 constituents and obesity remain unclear, particular in densely populated and highly polluted regions. This study aims to assess the obese risk related to long-term exposure to PM2.5 components among the Chinese elderly. We designed two nationwide dynamic cohort followed up from 2011 to 2015, through combining respondents from 28 provinces and estimates of PM2.5 constituents predicted by well-validated spatiotemporal models. Based on data of physical examination measured

by well-trained interviewers using standard devices, we adopted body mass index and waist circumference to define systemic and abdominal obesity, respectively. Cox proportional hazard models with time-varying exposures and a qg-computation approach were employed to evaluate individual and joint associations of obesity with long-term exposure to PM2.5 constituents. The prevalences of systemic and abdominal obesity were 5.7% and 26.0% during 43814.6 and 27052.9 person-years follow-up, respectively. In the single-constituent analysis, the highest risk of systemic obesity derived from multivariable-adjusted model was 1.62 (95%: 1.40-1.87) linked with a 10.2 μg/m3 increase of , while the top-risk component of abdominal obesity was , with a hazard ratio of 1.30 (95% CI: 1.20-1.41) for per 6.2 μg/m3 rise. For joint exposure, a quartile increase in the five-component mixture was associated with a 29% (95% CI: 19-40%) and 17% (95% CI: 12-23%) higher risk of systemic and abdominal obesity, respectively. This study offered robust associations between long-term exposure to PM2.5 constituents and increased risks of both obesity outcomes, suggesting that reducing air pollution could lower the obesity burden.

Authors: Yang Yuan, Kai Wang, Yongqiang Liu, Yaqi Wang, Yunquan Zhang
Full Source: Environmental pollution (Barking, Essex : 1987) 2026 Feb 6:127777. doi: 10.1016/j.envpol.2026.127777.