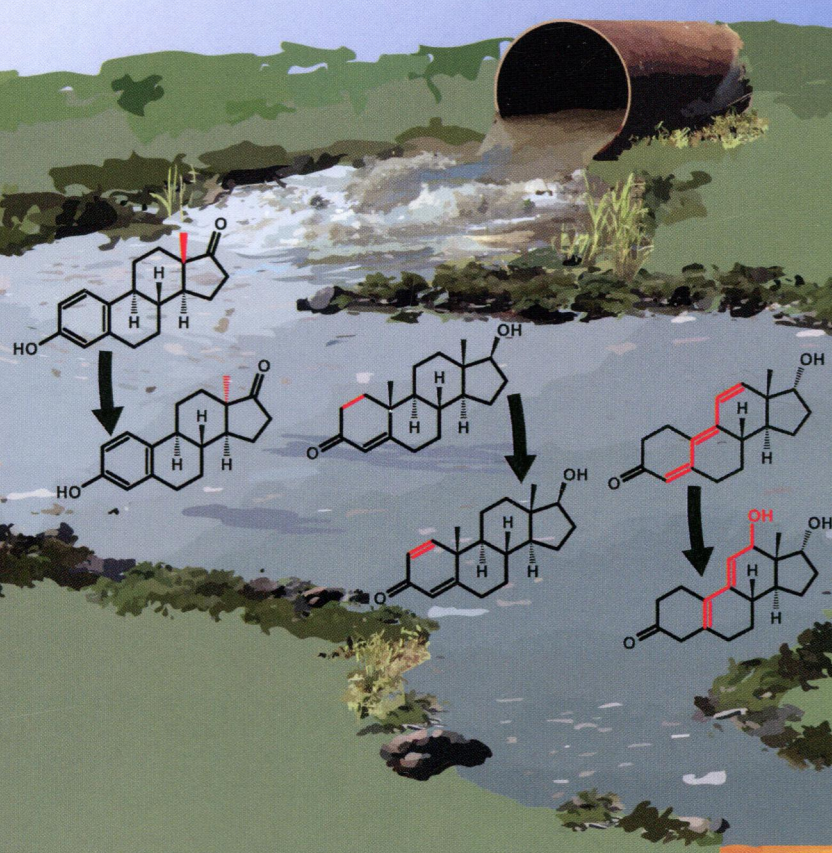


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**Bioactive
transformation
products: overlooked
contaminants?**



ON THE COVER: Can the environment make drugs from drugs? Transformations that largely conserve pollutant structure may also sometimes conserve pollutant bioactivity, as is the case for the photochemical epimerization of estrone to lumiestrone, the biotransformation of testosterone to boldenone, and the photohydration of 17 α -trenbolone (shown from left to right). This issue's feature article considers such environmental designer drugs, a potentially overlooked and hard to detect pollutant class that challenges traditional paradigms for environmental fate and risk assessment.

Features

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Environmental Designer Drugs: When Transformation May Not Eliminate Risk

David M. Cwiertny,* Shane A. Snyder, Daniel Schlenk, and Edward P. Kolodziej*

Environmental transformation processes, including those occurring in natural and engineered systems, do not necessarily drastically alter molecular structures of bioactive organic contaminants. While the majority of generated transformation products are likely benign, substantial conservation of structure in transformation products can imply conservation or even creation of bioactivity across multiple biological end points and thus incomplete mitigation of ecological risk. Therefore, focusing solely on parent compound removal for contaminants of higher relative risk, the most common approach to fate characterization, provides no mechanistic relationship to potential biological effects and is inadequate as a comprehensive metric for reduction of ecological risks. Here, we explore these phenomena for endocrine-active steroid hormones, focusing on examples of conserved bioactivity and related implications for fate assessment, regulatory approaches, and research opportunities.

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Underappreciated Role of Regionally Poor Water Quality on Globally Increasing Antibiotic Resistance

David W. Graham,* Peter Collignon, Julian Davies, D. G. Joakim Larsson, and Jason Snape

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Critical Review and Interpretation of Environmental Data for Volatile Methylsiloxanes: Partition Properties

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11794 [dx.doi.org/10.1021/es5021873](https://doi.org/10.1021/es5021873)

On the Use of Hydroxyl Radical Kinetics to Assess the Number-Average Molecular Weight of Dissolved Organic Matter
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11803 [dx.doi.org/10.1021/es502444c](https://doi.org/10.1021/es502444c)

Adsorption of the Herbicide 4-Chloro-2-methylphenoxyacetic Acid (MCPA) by Goethite
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Complete Survey of German Sewage Sludge Ash
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Contribution of Groundwater Discharge to the Coastal Dissolved Nutrients and Trace Metal Concentrations in Majorca Island: Karstic vs Detrital Systems

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Combined C and Cl Isotope Effects Indicate Differences between Corrinoids and Enzyme (*Sulfurospirillum multivorans* PceA) in Reductive Dehalogenation of Tetrachloroethene, But Not Trichloroethene

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Microplastic is an Abundant and Distinct Microbial Habitat in an Urban River

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First Evidence of Amoebae–Mycobacteria Association in Drinking Water Network

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Different Arsenate and Phosphate Incorporation Effects on the Nucleation and Growth of Iron(III) (Hydr)oxides on Quartz

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Aqueous Aggregation and Surface Deposition Processes of Engineered Superparamagnetic Iron Oxide Nanoparticles for Environmental Applications

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Zinc Speciation in the Suspended Particulate Matter of an Urban River (Orge, France): Influence of Seasonality and Urbanization Gradient

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Isotopologue Ratios of N₂O and N₂ Measurements Underpin the Importance of Denitrification in Differently N-Loaded Riparian Alder Forests

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Model Analysis of Secondary Organic Aerosol Formation by Glyoxal in Laboratory Studies: The Case for Photoenhanced Chemistry

Andrew J. Sumner, Joseph L. Woo, and V. Faye McNeill*

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dx.doi.org/10.1021/es5020955

Nickel and Zinc Isotope Fractionation in Hyperaccumulating and Nonaccumulating Plants

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dx.doi.org/10.1021/es502243m

Fractionation of Fulvic Acid by Iron and Aluminum Oxides—Influence on Copper Toxicity to *Ceriodaphnia dubia*

Kathleen S. Smith,* James F. Ranville,* Emily K. Leshner, Daniel J. Diedrich, Diane M. McKnight, and Ruth M. Sofield

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Secondary Organic Aerosol Formation and Organic Nitrate Yield from NO₃ Oxidation of Biogenic Hydrocarbons

Juliane L. Fry,* Danielle C. Draper, Kelley C. Barsanti, James N. Smith, John Ortega, Paul M. Winkler, Michael J. Lawler, Steven S. Brown, Peter M. Edwards, Ronald C. Cohen, and Lance Lee

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Size-Controlled Dissolution of Silver Nanoparticles at Neutral and Acidic pH Conditions: Kinetics and Size Changes

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dx.doi.org/10.1021/es502360c

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Coupled Mercury–Cell Sorption, Reduction, and Oxidation on Methylmercury Production by *Geobacter sulfurreducens* PCA

Hui Lin, Jennifer L. Morrell-Falvey, Balaji Rao, Liyuan Liang, and Baohua Gu*

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Production of Hydroxylated Polybrominated Diphenyl Ethers from Bromophenols by Bromoperoxidase-Catalyzed Dimerization

Kunde Lin, Jay Gan, and Weiping Liu*

11984  [dx.doi.org/10.1021/es503073z](https://doi.org/10.1021/es503073z)

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Source Apportionment Using Radiocarbon and Organic Tracers for PM_{2.5} Carbonaceous Aerosols in Guangzhou, South China: Contrasting Local- and Regional-Scale Haze Events

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Light-Absorbing Oligomer Formation in Secondary Organic Aerosol from Reactive Uptake of Isoprene Epoxydiols

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12022  [dx.doi.org/10.1021/es503351u](https://doi.org/10.1021/es503351u)

Quantitative Retention of Atmospherically Deposited Elements by Native Vegetation Is Traced by the Fallout Radionuclides ⁷Be and ²¹⁰Pb

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Hexachlorocyclohexanes in Tree Bark across Chinese Agricultural Regions: Spatial Distribution and Enantiomeric Signatures

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12039  [dx.doi.org/10.1021/es503399r](https://doi.org/10.1021/es503399r)

Photolytic Degradation Products of Two Highly Brominated Flame Retardants Cause Cytotoxicity and mRNA Expression Alterations in Chicken Embryonic Hepatocytes

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Molecular Selectivity of Brown Carbon Chromophores

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The Remarkable Environmental Rebound Effect of Electric Cars: A Microeconomic Approach
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Near-Unity Mass Accommodation Coefficient of Organic Molecules of Varying Structure
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Chemical Mass Balance Model Applied to an Olfactory Annoyance Problematic
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Spatial and Temporal pCO₂ Marine Monitoring Near Panarea Island (Italy) Using Multiple Low-Cost GasPro Sensors
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Satellite-Derived Subsurface Urban Heat Island

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Quantitative Assessment of the Distribution of Dissolved Au, As and Sb in Groundwater Using the Diffusive Gradients in Thin Films Technique

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Effect of Bubbles and Silica Dissolution on Melter Feed Rheology during Conversion to Glass

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Removal of Elemental Mercury from Flue Gas by Thermally Activated Ammonium Persulfate in A Bubble Column Reactor

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Impact of UV/H₂O₂ Pre-Oxidation on the Formation of Haloacetamides and Other Nitrogenous Disinfection Byproducts during Chlorination

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Mechanism of the Selective Catalytic Oxidation of Slip Ammonia over Ru-Modified Ce–Zr Complexes Determined by In Situ Diffuse Reflectance Infrared Fourier Transform Spectroscopy

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Remediation and Selective Recovery of Metals from Acidic Mine Waters Using Novel Modular Bioreactors

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Degradation, Phytoprotection and Phytoremediation of Phenanthrene by Endophyte *Pseudomonas putida*, PD1

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Jie Zhang, Heqing Shen,* Weipan Xu, Yankai Xia, Dana Boyd Barr, Xiaoli Mu, Xiaoxue Wang, Liangpo Liu, Qingyu Huang, and Meiping Tian

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Multigenerational Exposure to Ocean Acidification during Food Limitation Reveals Consequences for Copepod Scope for Growth and Vital Rates

Sindre A. Pedersen,* Ole Jacob Håkedal, Iurgi Salaberria, Alice Tagliati, Liv Marie Gustavson, Bjørn Munro Jenssen, Anders J. Olsen, and Dag Altin

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Binary Short-Range Colloidal Assembly of Magnetic Iron Oxides Nanoparticles and Fullerene (nC₆₀) in Environmental Media

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Predicting the Impacts of CO₂ Leakage from Subseabed Storage: Effects of Metal Accumulation and Toxicity on the Model Benthic Organism *Ruditapes philippinarum*

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Accumulation and Embryotoxicity of Polystyrene Nanoparticles at Early Stage of Development of Sea Urchin Embryos *Paracentrotus lividus*

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***In Vitro* Interaction of Emerging Contaminants with the Cytochrome P450 System of Mediterranean Deep-Sea Fish**

Carla Ribalta and Montserrat Solé*

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Michael E. Walker,* Craig S. Arnold, David J. Lettieri, Margot J. Hutchins, and Eric Masanet*

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Silvia Ahualli, María M. Fernández, Guillermo Iglesias, Ángel V. Delgado, and María L. Jiménez*

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The Mechanism of Vapor Phase Hydration of Calcium Oxide: Implications for CO₂ capture

Krzysztof Kudłacz and Carlos Rodríguez-Navarro*

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Regulating Low-NO_x and High-Burnout Deep-Air-Staging Combustion under Real-Furnace Conditions in a 600 MW_e Down-Fired Supercritical Boiler by Strengthening the Staged-Air Effect

Min Kuang, Zhihua Wang,* Yanqun Zhu, Zhongqian Ling, and Zhengqi Li

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Enhanced Sulfur Tolerance of Nickel-Based Anodes for Oxygen-Ion Conducting Solid Oxide Fuel Cells by Incorporating a Secondary Water Storing Phase

Feng Wang, Wei Wang,* Jifa Qu, Yijun Zhong, Mose O. Tade, and Zongping Shao*

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Module-Scale Analysis of Pressure Retarded Osmosis: Performance Limitations and Implications for Full-Scale Operation

Anthony P. Straub, Shihong Lin, and Menachem Elimelech*

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Consideration of Black Carbon and Primary Organic Carbon Emissions in Life-Cycle Analysis of Greenhouse Gas Emissions of Vehicle Systems and Fuels

Hao Cai* and Michael Q. Wang

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A Group of Sequence-Related Sphingomonad Enzymes Catalyzes Cleavage of β -Aryl Ether Linkages in Lignin β -Guaiaacyl and β -Syringyl Ether Dimers

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Utilization of CO₂ Fixating Bacterium *Actinobacillus succinogenes* 130Z for Simultaneous Biogas Upgrading and Biosuccinic Acid Production

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Comment on "Determining the Ecological Impacts of Organic Contaminants in Biosolids Using a High-Throughput Colorimetric Denitrification Assay: A Case Study with Antimicrobial Agents"

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12470

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Response to Comment on "Determining the Ecological Impacts of Organic Contaminants in Biosolids Using a High-Throughput Colorimetric Denitrification Assay: A Case Study with Antimicrobial Agents"

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Additions and Corrections

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Correction to Mineralogical Controls on Aluminum and Magnesium in Uranium Mill Tailings: Key Lake, Saskatchewan, Canada

M. A. Gomez,* M. J. Hendry, J. Koshinsky, J. Essilfie-Dughan, S. Paikaray, and J. Chen

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Correction to Copper Oxide Nanoparticle Mediated DNA Damage in Terrestrial Plant Models

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