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Aim: Following the implementation of the REACH restriction, new limits have been introduced on substances in tattoo inks. However, these are based on *ex vivo*-experiments with pigments and might not accurately represent an *in vivo*-scenario. The aim of this study is therefore to determine the exposure, kinetics and metabolic profiles of soluble tracer substances that were added to the ink prior to tattooing.

Methods: Twenty-four subjects were tattooed with a design of their choice using black or red ink. The three tracer substances 4-aminobenzoic acid, 2-phenoxyethanol and potassium iodide were added to commercially available tattoo inks. 4-Aminobenzoic acid was selected due to the structural similarity to aryls with an amino group, 2-phenoxyethanol as a representative for preservatives used in tattoo inks and iodide to determine the amount of intradermally applied ink. Blood, urine, ink and the consumables used for tattooing were collected and subsequently analysed. The study period was 24 hours before and after start of tattooing. Liquid chromatography coupled to time-of-flight mass spectrometer (HPLC-QTOF) was used to determine 4-aminobenzoic acid, 2-phenoxyethanol and their metabolites. Iodine was quantified by elemental analysis using inductively-coupled plasma mass spectrometry (ICP-MS). All methods were validated beforehand. The peroral metabolic profile of PABA was determined in three subjects as comparison.

Results: The estimated amount of ink and systemically available amount of tracers showed large discrepancies. We conclude that a large amount of tracers were excreted via wound healing. The systemic exposure to tattoo inks in this study is about a magnitude lower then previously estimated. The metabolic profiles of 4-aminobenzoic acid showed increased *N*-acetylation compared to peroral administration which confirms a first-pass effect occurs in skin also occurs during tattooing.

Outlook: The obtained exposure data can contribute to an improved risk assessment and may translate into new limits for substances in tattoo inks. Furthermore, the metabolization data of 4-aminobenzoic acid upon tattooing might be transferable to substances of high concern, such as primary aromatic amines, which cannot be tested due to their hazard profile. The data will be used in a tattoo-specific physiologically based (pharmaco)kinetic model in future.

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Data management for image-based characterisation of 2D nano-materials

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The ACCORDs project, funded through Horizon Europe, is pioneering a novel approach to investigate Graphene Family Materials (GFMs) through image analysis. Our aim is to unveil how these materials might influence health and the environment. To achieve this, we are developing a platform designed for the easy retrieval, access, sharing, and utilisation of GFM data and the coordination between biological and physico-chemical data formats. Integral to this platform is an OMERO-based library for image storage,[1] alongside data collection forms and image analysis tools. Efforts are underway to streamline the process for researchers to upload and disseminate their findings, manage information within a database and navigate the data with ease. Adhering to REMBI guidelines,[2] which set the standard for annotating biological images with metadata, we ensure our data collection is comprehensive and adheres to established best practices. Initially, we are employing thresholding and basic machine learning techniques for image segmentation, laying the groundwork for advanced analysis through deep learning to gain more profound insights. Upon completion, the project will deliver a comprehensive platform facilitating efficient data and image management concerning GFMs. This platform will enable the straightforward discovery and use of protocols and results, all organised in accordance with the FAIR principles – Findable, Accessible, Interoperable, and Reusable. [3] This initiative is poised to significantly impact materials science, enhancing our comprehension of the safety and environmental implications of 2D materials.

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