

fruit production caused by the disease has led to decreased productivity of citrus farms which in turn causes negative significant economic loss to the citrus industry. Silver nanoparticles were synthesized, and surface functionalized with charged and uncharged groups. The resulting nanoparticles were characterized for size and shape measurements using dynamic light scattering (DLS), transmission electron microscopy (TEM) and atomic force microscopy (AFM). Ultraviolet-visible spectroscopy (UV-Vis) of nanoparticles was done to characterize the differences in surface coating of the nanoparticles followed by Fourier-transform infrared (FTIR) analyses for functional group characterization. Exposure studies carried out on the psyllid vector show differential accumulation of silver nanoparticles based on surface coating. Inductively coupled plasma mass spectrometry (ICPMS) show that negatively charged silver nanoparticles coated with citrate had the highest accumulation concentration (8.27 µg/L) after 96 h of exposure through an artificial feeding media compared to positively charged and uncharged silver nanoparticles. The result obtained from this study are indicative that other arthropods would have similar responses to nanoparticle exposure and that this approach of disease control may be translatable to other vectors of pathogenic diseases.

PS 2164 An In-Depth Multi-'omics Investigation on Different Nanomaterials: A Promising Tool to Support Nanomaterial Grouping

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Nanomaterials (NMs) can be manufactured in plenty of variants demanding for alternative approaches for hazard assessment such as grouping and read-across. Multi-omics analyses are useful for establishing grouping and to justify read-across as they provide detailed insights into NM mode of action (MoA). Here we applied a multi-omics approach considering metabolomics, proteomics and transcriptomics for 12 different NMs including seven SiO₂ variants with a systematic variation of particle size, structure, surface charge and hydrophobicity as well as five other NMs, i.e. two organic pigments, TiO₂ NM-105, Graphene oxide and Mn₂O₃. All NMs were extensively characterized with respect to their physico-chemical properties. Toxicity was assessed *in vitro* in two different rat lung cell models, RLE-6TN rat lung epithelial cells and NR8383 rat alveolar macrophages, using several well-established assays. In addition, selected NMs were investigated *in vivo* in rats using short-term inhalation and instillation studies. Moreover, a multi-omics approach including proteomics, metabolomics and transcriptomics was applied for *in vitro* and *in vivo* samples. Our results demonstrate that NMs can be easily categorized based on changes in the profiles of the individual omics layers but a higher confidence was achieved in an integrated approach. Overall categorization was quite similar in both cell models and largely consistent with categorization based on well-established toxicity data. However, NM MoA was strongly cell-type specific. Overall, our approach appears to be very useful for NM grouping and we provide first examples how to integrate information on NM MoA.

PS 2165 Do Impurities in Boron Nitride Nanotube Material Influence Toxicity?

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Boron nitride nanotubes (BNNTs) have applications in a wide array of industries. Prior BNNT toxicity findings vary and could be attributed to the many manufacturing processes by which BNNTs are produced. These manufacturing processes result in BNNTs with a divergent array of physicochemical characteristics, but commercial processes share a common challenge of having 30-60 % residuals and impurities. Here we evaluated the impact of these

impurities on the toxicological profile of BNNT materials. Four BNNT samples made by induction thermal plasma process with a gradient of BNNT purity levels (~50~90% pure) were used to assess toxicity. Hexagonal boron nitride (h-BN) (~100 nm in diameter) was used as a reference material. Electron micrographs confirmed a decrease in impurities and an increase in tubular structures across the gradient. The BNNTs dispersed in dispersion media decreased in as-produced dimensions and had a length of ~0.5-1.5 µm, diameter of ~5-30 nm, hydrodynamic diameter of 284-396 nm, surface area of 23-150 m²/g and density of 0.01-0.27 g/cm³. Electron paramagnetic resonance showed no change in acellular oxidative stress potential among the BNNTs of various purities. Cytotoxicity, proliferation, cellular oxidative stress, NF-κB-based induction of inflammation, and inflammasome activation were assessed in differentiated human monocytes (THP-1) at a concentration range of 0-100 µg/mL. There was a small increase in cytotoxicity and membrane damage with the highly purified BNNT materials, which decreased as the purity of the mixtures decreased. Oxidative stress measured by 4-hydroxynonenal expression, NF-κB by NF-κB-SEAP-expressing THP-1 cells, inflammasome activation by cellular caspase-1 and supernatants for IL1β and IL18 showed a dose-dependent increase with increasing BNNT purity. At all measured end points there was minimal effect with h-BN at the measured concentrations. Computational modeling was used to identify the physicochemical characteristics that altered biological response. This work shows that BNNT mixtures manufactured through the plasma process have low toxicity in general; the increase in toxicity with increasing purity shows that the impurities have minimal role towards the toxicity endpoints measured.

PS 2166 Characterization of Nanoparticle Transformations in Physiologically Relevant Fluids

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Nanoparticles are increasingly used in biomedical applications due to their high surface area to volume ratio, ease of surface functionalization, and inherent ability to be excreted. Metal nanoparticles of like surface charge have been shown to display repulsive tendencies; but at physiologically relevant pH, these same particles form a double layer enabling particle stability. When nanomaterials travel through the body to their target site, they encounter many different aqueous environments which may alter colloidal stability. We hypothesize that nanoparticles will become increasingly unstable as the physiologically-relevant fluid they encounter becomes increasing complex. Specifically, the stability of the nanoparticles will be directly related to (1) pH, (2) the concentration of proteins in the biofluid, and (3) the ionic strength of the surrounding matrix. To test this hypothesis, we compared three different surface-functionalized silver nanoparticles that result in positive, negative, and neutral surface charge, which was confirmed through electron microscopy and spectroscopic techniques. Each particle system was incubated in different physiologically-relevant environments: acidic stomach fluid, neutral blood serum, and basic surfactant fluid. Negatively charged particles were noted to undergo the most significant transformations, whereas the particles with neutral surface charges were seen to have the least transformation. The information obtained from these studies will provide crucial insight into colloidal stability of biotransformed nanoparticles, provide read-across comparisons between metal-based and polymeric-based nanoparticles, and aid in filling the literature gap in nanoparticle colloidal stability and how it affects nanoparticle biotransformation.

PS 2167 Polymer Assisted *In Situ* Synthesis of Silver Nanoparticles with Epigallocatechin Gallate (EGCG) Impregnated Wound Patch Potentiate-Controlled Inflammatory Responses for Brisk Wound Healing in Both Normal and Diabetic Condition

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Diabetic patients often come up with complications such as delayed skin wound healing due to markedly enhanced inflammatory phase. Similarly, non-diabetic patients may also suffer from chronic wounds without proper dressing which fails in maintaining the cycle of inflammation, proliferation, and remodeling of skin wounds. Although various clinically proven dressing materials are available, yet the scope of developing better efficacious materials, will help the patient's centric medicare. Embarking on the same philosophy, we have designed hydrogel wound patches based on biopolymer, Guar gum, and the proven microbicidal silver NPs to promote the wound environment for accelerated wound healing. Incidentally, modified polymer begets *in situ* synthesis of silver NPs of 6 to 12nm size, besides lending ionic surface

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Preface

This issue is devoted to the abstracts of the presentations for the Continuing Education courses and Scientific Sessions of the 59th Annual Meeting of the Society of Toxicology, held at the Anaheim Convention Center, Anaheim, California, March 15–19, 2020.

An alphabetical Author Index, cross-referencing the corresponding abstract number(s), begins on page 542.

The issue also contains a Keyword Index (by subject or chemical) of all the presentations, beginning on page 580.

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