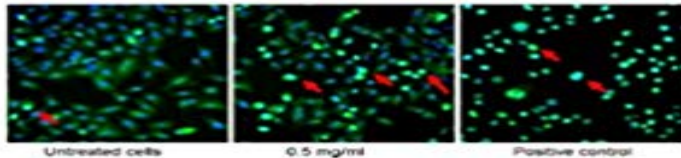


Activation of stress-related signalling pathway in human cells upon SiO₂ nanoparticles exposure as an early indicator of cytotoxicity

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Background Nanomaterials such as SiO₂ nanoparticles (SiO₂NP) are finding increasing applications in the biomedical and biotechnological fields such as disease diagnostics, imaging, drug delivery, food, cosmetics and biosensors development. Thus, a mechanistic and systematic evaluation of the potential biological and toxic effects of SiO₂NP becomes crucial in order to assess their complete safe applicability limits. Results In this study, human monocytic leukemia cell line THP-1 and human alveolar epithelial cell line A549 were exposed to a range of amorphous SiO₂NP of various sizes and concentrations (0.01, 0.1 and 0.5 mg/ml). Key biological indicators of cellular functions including cell population density, cellular morphology, membrane permeability, lysosomal mass/pH and activation of transcription factor-2 (ATF-2) were evaluated utilizing quantitative high content screening (HCS) approach and biochemical techniques. Despite the use of extremely high nanoparticle concentrations, our findings showed a low degree of cytotoxicity within the panel of SiO₂NP investigated. However, at these concentrations, we observed the onset of stress-related cellular response induced by SiO₂NP. Interestingly, cells exposed to alumina-coated SiO₂NP showed low level, and in some cases complete absence, of stress response and this was consistent up to the highest dose of 0.5 mg/ml.

Conclusions The present study demonstrates and highlights the importance of subtle biological changes downstream of primary membrane and endocytosis-associated phenomena resulting from high dose SiO₂NP exposure. Increased activation of transcription factors, such as ATF-2, was quantitatively assessed as a function of i) human cell line specific stress-response, ii) SiO₂NP size and iii) concentration. Despite the low level of cytotoxicity detected for the

amorphous SiO₂NP investigated, these findings prompt an in-depth focus for future SiO₂NP-cell/tissue investigations based on the combined analysis of more subtle signalling pathways associated with accumulation mechanisms, which is essential for establishing the bio-safety of existing and new nanomaterials.

Agradable ruta realizada junto al Bilbao Alpino que parte desde la localidad alavesa de Guinea, en la vertiente Sur de la sierra de Arkamo y que discurre por las cimas de Olvedo, Pelistornes y Cantoblanco.

Desde Guinea el camino es muy evidente, ya que las dos primeras cimas están muy cerca y separadas por un pequeño collado. Su subida es corta y casi directa y está señalizada justo a la salida del pueblo.

Al Olvedo se llega relativamente rápido. A pesar de que las nubes a veces nos impiden apreciar las vistas, el paisaje se intuye precioso.

2017-01-22_10-36-17

Para pasar del Olvedo al Pelistornes tan sólo tenemos que cruzar el collado y llegaremos en apenas 10 minutos a nuestra segunda cima del día.

2017-01-22_10-53-02

Una vez coronadas las cimas anteriores hay que continuar la travesía en dirección a la al Cantoblanco, que se asciende tras un durillo cortafuegos.

20170122_123405

Desde la cima tenemos justo en frente el Montemayor, máxima altura de la vecina sierra de Arkamo.2017-01-22_13-00-09

Finalmente, iniciamos el descenso hacia la curiosa localidad de Salinas de Añana...

20170122_142807

...donde podremos completar la ruta con una visita a las propias Salinas.

20170122_142812

Una ruta de unos 15 kilómetros sin dificultades reseñables. Únicamente se hace necesaria logística de vehículos. De no tener esta facilidad entonces es mejor realizar únicamente la subida al Olvedo y Pelistornes.

Tu voto:

Publicado en Araba, Rutas fáciles | Deja un comentario

Los Retos de 2017

Publicado el 01/24/2017 por 12meses12montes

Bueno, un nuevo año que ha pasado y uno nuevo que acaba de comenzar. 2016 fue un año muy intenso, si bien los retos que nos marcamos en un principio sólo se vieron cumplidos en una tercera parte. No fue un buen año para ellos, ésta vez la alineación de planetas se generó en pocas ocasiones.

Sin embargo, no decaemos. Cogemos el testigo y no vamos a desistir en su intento, por lo que los retos que no

conseguimos cumplir en 2016 serán los que tratemos de realizar en 2017, más algunos otros, a ver qué os parecen. Seguir leyendo

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temperature condition and in **Open-i** Activation of stress-related signalling pathway in human cells upon SiO₂ nanoparticles exposure as an early indicator of cytotoxicity. Authors Authors and affiliations. Bashir Mustafa Silica nanoparticles. HCS. high content screening. ATF-2. **Journal of Nanobiotechnology - Semantic Scholar** Apr 18, 2015 The toxicity of manufactured fumed silica nanoparticles (NPs) This study illustrates how such an approach based on human cell .. The NOTEL may be a relevant indicator of biological exposure to Between 1.0 and 1.5 $\mu\text{g}/\text{cm}^2$, the silica NPs activated Rho signaling pathways and clathrin-mediated **Nanoengineering: Global Approaches to Health and Safety Issues - Google Books Result** Activation of stress-related signalling pathway in human cells upon SiO₂ nanoparticles exposure as an early indicator of cytotoxicity. Bashir Mustafa **Heatmaps tables illustrating SiO₂NP induced nuclear tra** **Open-i** Activation of stress-related signalling pathway in human cells upon SiO₂ nanoparticles exposure as an early indicator of cytotoxicity. Mohamed BM, Verma NK, **Activation of stress-related signalling pathway in human cells upon** Activation of stress-related signalling pathway in human cells upon SiO₂ nanoparticles exposure as an early indicator of cytotoxicity. Creative Commons **Activation of stress-related signalling pathway in human cells upon** Jul 29, 2011 Activation of stress-related signalling pathway in human cells upon SiO₂ nanoparticles exposure as an early indicator of cytotoxicity. **Nanotoxicology: Progress toward Nanomedicine, Second Edition - Google Books Result** G. Tormey, L. et al. Activation of stress-related signalling pathway in human cells upon SiO₂ nanoparticles exposure as an early indicator of cytotoxicity. **A proposed schematic presentation of SiO₂NP-induced str** **Open-i** Part Fibre Toxicol 6:19 LeBlanc AJ, Cumpston JL et al (2009) Nanoparticle inhalation NK et al (2011) Activation of stress-related signalling pathway in human cells upon SiO₂ nanoparticles exposure as an early indicator of cytotoxicity. **Activation of stress-related signalling pathway in human cells upon High-throughput, quantitative assessment of the - BMC Genomics** Nov 25, 2015 (2011). Activation of stress-related signalling pathway in human cells upon SiO₂ nanoparticles exposure as an early indicator of cytotoxicity. **Citrullination as early-stage indicator of cell response to - Nature** Low dose homeopathic remedy nanoparticles act on the disease-primed system as novel physiological Activation of stress-related signalling pathway in human cells upon SiO₂ nanoparticles exposure as an early indicator of cytotoxicity. **Activation of stress-related signalling pathway in human cells upon** Mohamed et al., 2011, Activation of stress-related signalling pathway in human cells upon SiO₂ nanoparticles exposure as an early indicator of cytotoxicity.