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Toxicogenomics

Renal toxicogenomic response to chronic uranyl nitrate insult in mice

Magali Taulan^{‡¶}, François Paquet[‡], Christophe Maubert[‡], Olivia Delissen[‡], Jacques Demaille[¶]
and Marie-Catherine Romey^{¶*}

[‡] Institut de Radioprotection et de Sûreté Nucléaire
DRPH / SRBE / LRTOX
Laboratoire de radiotoxicologie expérimentale
Site du Tricastin - BP 166 - 26702 Pierrelatte Cedex, France.

[¶] Institut de Génétique Humaine
Laboratoire de Génétique Moléculaire et Chromosomique.
CNRS UPR 1142
141, Route de la Cardonille, 34396 Montpellier Cedex 05, France.

*** Corresponding author:**
Marie-Catherine Romey
Laboratoire de Génétique Moléculaire et Chromosomique.
Institut de Génétique Humaine
141, Route de la Cardonille
34396 Montpellier Cedex 05
phone: (33) 4 67 41 53 64
Fax: (33) 4 67 41 53 65
E-mail: Marie-Catherine.Romey@igh.cnrs.fr

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Abbreviations:

γ GT: Gamma Glutamyl Transpeptidase

GPx3: Glutathion Peroxidase 3

KAP: Kidney Androgen regulated Protein

KPA: Kinetic Phosphorescence Analyzer

NaPi-II: Solute carrier family 34 (sodium phosphate member 1)

ODC: Ornithine Decarboxylase

ROS: Reactive Oxygen Species

Rps26: Ribosomal protein S26

SAGE: Serial Analysis of Gene Expression

SOD: Superoxide Dismutase

TCTP: Translationally Controlled Tumor Protein

THP: Tamm-Horsfall Protein

U: Uranium

UMOD: Uromodulin

UN: Uranyl Nitrate

Outline of manuscript section headers:

Renal toxicogenomic response to chronic uranyl nitrate insult in mice

Introduction

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Results

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- ✓ *Oxidative stress response*
- ✓ *Involvement of gene encoding ion transporters*
- ✓ *Involvement of protein biosynthesis-related genes*
- ✓ *Others genes of interest*

References

Abstract

While the nephrotoxicity of uranium has been established through numerous animals studies, relatively little is known about the effects of long-term environmental uranium exposure. Using a combination of conventional biochemical studies and serial analysis of gene expression, we examined the renal responses to uranyl nitrate chronic exposure. Renal uranium levels were significantly increased four months after ingestion of uranium in drinking water. Creatinine levels in serum were slightly but significantly increased compared to controls. Although, no further significant differences in other parameters were noted, substantial molecular changes were observed in toxicogenomic profiles. UN induced dramatic alterations in expression level of more than 200 genes, mainly up-regulated, including oxidative response related genes, genes encoding for cellular metabolism, ribosomal protein, signal transduction and solute transporters. Seven differentially expressed transcripts were confirmed by real-time quantitative PCR. In addition, significantly increased peroxides levels support the implication of oxidative stress in UN toxicant response. This report highlights the potential of SAGE for the discovery of novel toxicant-induced gene expression alterations. Here, we present, for the first time, a comprehensive view on renal molecular events following uranium long-term exposure.