

Meeting

The theme of the Ninth Keele Meeting is "Aluminium and Life: Living in the Aluminium Age."

SEE BELOW FOR PROGRAM DETAILS!!

AIMS OF THE MEETING

In the natural selection of the chemical elements of life the principle of the most economical utilisation of resources dictates biochemical essentiality. In essence, the most abundant elements are also those that are essential to life. Silicon, the second most abundant element of the Earth's crust, and especially aluminium, as the third most abundant, are not essential to life on Earth. Indeed aluminium is inimical to life and is arguably the Earth's most serious ecotoxicant. There are few who would refute the pivotal role played by aluminium in the devastation which is wreaked by acid deposition (Acid Rain) or, indeed, its role in limiting plant growth in acid sulphate soils. We know from myriad examples of animal models of aluminium intoxication that there are few if any biochemical systems which are not disrupted through exposure to aluminium. We are aware of human conditions, such as dialysis encephalopathy and osteomalacia, which are caused by exposure to aluminium and yet in spite of decades of sound scientific evidence to the contrary we largely in the main consider human exposure to aluminium to be benign. At least, this is the view held by those charged with the responsibility of deciding which research is allowed to proceed through funding and which is not! With this stark truth apparent to all it is a minor miracle that research into aluminium has not been completely curtailed and yet, we have remained undaunted in our efforts to continue this incredibly important line of work and to report our efforts at Keele Meetings. Congratulations to one and all as we approach the Ninth Keele Meeting on Aluminium. This is the most important platform for presentation of research into all fields of aluminium and is influenced only by the quality of the research presented and not be the vested interests which perpetrate many other scientific platforms. I, for one, am already excited about the new science that will be presented at the Ninth Meeting and I invite you all once again to join in our global discussion of our mutually favourite element!

-Chris Exley

SOCIAL AND SCIENTIFIC PROGRAMME

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Saturday 19th February 2011

17.00 Registration and Poster Assembly

20.00 Welcome to Meeting / Pub Night at The Olde Angel Inn

Sunday 20th February 2011

The Conference is Open!

*Graduate/Postgraduate Presentation

‡Graduate/Postgraduate Bursary

Session 1 Aluminium Chemistry

Chair: *Christopher Shaw* (University of British Columbia, Canada)

8.55 Introduction by the Chair

9.00 Platform 1

Progress of hydrolysis and polymerization of aluminium silicate complexes

Arja Sarpola (University of Oulu, Oulu, Finland)

9.20 Discussion

9.30 Platform 2

Formation of Al-EDTA-silicate ternary complex in aqueous solution

Takushi Yokoyama (Kyushu University, Japan)

9.50 Discussion

10.00 Poster 1*

Speciation and coagulation performance of aluminium formate

Marja Väänänen (University of Oulu, Oulu, Finland)

10.05 Discussion

10.10 Poster 2*

Interaction between Aluminium Ions and Acrylic and Poly Acrylic Acids under Acidic Condition

Mayumi Etou (Kyushu University, Japan)

10.15 Discussion

10.20 Platform 3

Effects of drying droplet to speciation of aluminium hydrolysis products

Giorgio Lanzani (University of Oulu, Oulu, Finland)

10.40 Discussion

10.50 Poster 3

Surface charge properties and thermal behaviour of aluminium silicate clays

Tiina Leiviskä (University of Oulu, Oulu, Finland)

10.55 Discussion

11.00 **COFFEE**

Session 2 Environmental Aluminium Chemistry

Chair: *Ondřej Drábek* (Czech University of Life Sciences, Prague, Czech Republic)

11.25 Introduction by the Chair

11.30 Platform 4

Fluorescence characterization of the interaction of aluminum with Suwannee River fulvic acid in the absence and presence of the herbicide 2-(2,4-dichlorophenoxy-)propionic acid

Kelly Elkins (Metropolitan State College of Denver, USA)

11.50 Discussion

12.00 Platform 5

New method for speciation analysis of aluminium and aluminium fluoride complexes in environmental samples by HPLC-UVVis

Marcin Frankowski (Adam Mickiewicz University, Drzymały, Poland)

12.20 Discussion

12.30 Poster 4*^{\$}

The influence of seasonal changes and wet deposition on forest soils affected by acidification processes

Monika Bradová (Czech University of Life Sciences, Prague, Czech Republic)

12.35 Discussion

12.40 Poster 5

Aluminium sorption in acidified forest soils

Ondřej Drábek (Czech University of Life Sciences, Prague, Czech Republic)

12.45 Discussion

13.00 **LUNCH**

Session 3 Aluminium and Plants

Chair: *Gregory Taylor* (University of Alberta, Canada)

14.15 Introduction by the Chair

14.20 Platform 6

Measuring aluminium transfer across plant membranes

Zed Rengel (University of Western Australia, Crawley, Australia)

14.40 Discussion

14.50 Poster 6

Phytotoxicity of aluminum on some biomarkers and electrolytic leakage in seedlings of *Lens culinaris*

Rafia Azmat (Jinnah University for Women, Karachi, Pakistan)

14.55 Discussion

15.00 Platform 7

The standard electrode potential predicts the pro-oxidant activities and toxicities of metal ions.

Tom Kinraide (US Department of Agriculture, Beaver, West Virginia, USA)

15.20 Discussion

15.30 Poster 7*

Cellular signaling mechanism for activation of respiratory burst oxidase homologues (rbohs) isoforms and stress-related transcription factors expressed in suspension-cultured cells of *Arabidopsis thaliana*

Shuta Kunihiro (University of Kitakyushu, Japan)

15.35 Discussion

15.40 Platform 8

Hyperresistance to aluminum in *Brachiaria* species

Charlotte Poschenrieder (Universidad Autónoma de Barcelona, Spain)

16.00 Discussion

16.10 **TEA**

Session 3 Aluminium and Plants cont.

16.30 Platform 9

A novel mechanism to overcome aluminium toxicity in plants: Repression of ROS production by an enhancement of glycolysis.

Yoko Yamamoto (Okayama University, Japan)

16.50 Discussion

17.00 Poster 8*

Exploring the potential role of the thioredoxin system, peroxiredoxins, and glutaredoxins in aluminum tolerance in yeast and Arabidopsis

Diana Lopez-Santiago (University of Alberta, Canada)

17.05 Discussion

17.10 Platform 10

Aluminium toxicity and signal transduction in cell suspensions of *Coffea arabica*

Teresa Hernández-Sotomayor (CICY, Mérida, México)

17.30 Discussion

Session 4 Environmental Toxicity of Aluminium

Chair: *Teresa Hernández-Sotomayor* (CICY, Mérida, México)

17.40 Introduction by the Chair

17.45 Platform 11

Aluminium in alkaline and acid water – accumulation on gills and effects in fish

Hans-Christian Teien (Norwegian University of Life Sciences, Ås, Norway)

18.05 Poster 9*^{\$}

Biosorption and bioaccumulation of aluminium by the *Aspergillus niger* strains isolated from various localities in Slovakia

Slavomír Čerňanský (Comenius University in Bratislava, Slovakia)

18.10 Discussion

18.15 Poster 10*^{\$}

Accumulation and toxicity of aluminium-contaminated food in the freshwater crayfish, *Pacifastacus leniusculus*.

Katie Woodburn (University of Manchester, UK)

18.20 Discussion

18.25 Poster 11*[&]

Secrets about aluminum toxic effects in water from LC50 studies of *Daphnia pulex*

Amy Jiang (University of British Columbia, Vancouver, Canada)*^S

18.30 Discussion

18.35 **END OF FIRST DAY**

20.00 **DINNER**

Monday 21st February 2011

Session 5 Aluminium and Biochemistry

Chair: *Niu Qiao* (Shanxi Medical University, Taiyuan, China)

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8.55 Introduction by the Chair

9.00 Platform 12

Special Topic: Title to be announced.

9.20 Discussion

9.30 Platform 13

Computational study of the complexes formed by aluminum and iron with serum transferrin

Jon Mujika (Euskal Herriko University, Donostia, Spain)

9.50 Discussion

10.00 **COFFEE**

10.20 Platform 14*

**Aluminum toxicity disrupts the homeostasis of a-ketoglutarate, a multi-functional metabolite:
Implications for neurological and hepatic disorders**

Joseph Lemire (Laurentian University, Sudbury, Canada)

10.40 Discussion

10.50 Platform 15

Cellular toxicity of aluminum: both in microsize and in nanosize

Qinli Zhang (Shanxi Medical University, Taiyuan, China)

11.10 Discussion

11.20 Poster 11

Electrochemical studies of the effects of Al(III) and nano-Al₁₃ species on the activity of NAD⁺/NADH-dependent dehydrogenase

Xiaodi Yang (Nanjing Normal University, Nanjing, China)

11.25 Discussion

11.30 Platform 16*

Aluminium effect on prolactin secretion

Ana Calejo (University of Aveiro, Portugal)

11.50 Discussion

12.00 Platform 17

Molecular mechanism of the influence of aluminum on gene expression

Shunsuke Meshitsuka (Tottori University Graduate School of Medicine, Japan)

12.20 Discussion

12.30 Poster 12

Aluminium and thyroid gland: a functional study using radiolabeled iodide ($^{125}\text{I}^-$) in rats

Daniel Orihuela (National University of the Litoral, Santa Fe, Argentina)

12.35 Discussion

12.40 Poster 13*^s

Cytotoxicity of environmentally relevant concentrations of aluminum

Jamal Kamalov (University at Albany, USA)

12.45 Discussion

12.50 Poster 14*

Studies on the neuromodulatory effects of curcumin against an aluminium-induced Alzheimer's like model

Pooja Khanna Sood (Panjab University, Chandigarh, India)

12.55 Discussion

13.00 **LUNCH**

FREE AFTERNOON

Excursion to Niagara Falls and selected winery tours - a chance to find out about Ontario's fabulous wine industry, including our award winning ice wines, and to view the splendour of the falls in winter

20.00 **DINNER**

Tuesday 22nd February 2011

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NOTE THE EARLIER START TODAY

Session 6 Human Exposure to Aluminium

Chair: *Stephen Bondy* (University of California, Irvine, USA)

8.25 Introduction by the Chair

8.30 Platform 18

Interaction of aluminum with erythropoietin and comparison with albumin

Denise Bohrer (Federal University of Santa Maria, Brazil)

8.50 Discussion

9.00 Poster 15*

Improvement in system performance of in vivo measurement of aluminum

Archit Patel (McMaster University, Hamilton, Canada)

9.05 Discussion

9.10 Platform 19*

The urinary excretion of silicon and aluminium in healthy volunteers

Sam Ward (Keele University, UK)

9.30 Discussion

9.40 Poster 16

Mild cognitive impairment (MCI) through occupational exposure to aluminium and other metals as revealed by brain imaging with SPECT.

Salvatore Polizzi (San Remigio Hospital, Carignano, Torino, Italy)

9.45 Discussion

9.50 Platform 20

Aluminium in the human brain

Emily House (Keele University, UK)

10.10 Discussion

10.20 Poster 17

Assessing in utero exposure to aluminium: analysis of human placenta and associations with select obstetric variables

Pamela Kruger (The University at Albany, USA)

10.25 Discussion

10.30 **COFFEE**

Session 7 Human Toxicity of Aluminium

_Chair: *Walter Lukiw* (Louisiana State University, USA)

10.55 Introduction by the Chair

11.00 Platform 21

Toxicity of aluminum in vitro and in vivo: relation to aluminum concentrations in humans

Christopher Shaw (University of British Columbia, Canada)

11.20 Discussion

11.30 Platform 22

Systemic transport of nanosized particles by phagocytes after intramuscular injection : relevance to alum adjuvant safety

Romain Gherardi (Paris Est-Creteil University, France)

11.50 Discussion

12.00 Platform 23

**Characterization of brain dysfunction in aluminium hydroxide-induced macrophagic myofasciitis
(MMF)**

François-Jérôme Authier (Paris Est-Creteil University, France)

12.20 Discussion

12.30 Platform 24

Antiperspirant aluminium salts and human breast disease

Philippa Darbre (University of Reading, UK)

12.50 Discussion

13.00 **LUNCH**

Session 8 Aluminium and Neurological Disease

Chair: *Salvatore Polizzi* and *Jonathan Todhunter* (San Remigio Hospital, Carignano, Torino, Italy)

14.00 Introduction by the Chair

14.05 Platform 25

Correlation of aluminium burden from vaccine adjuvants and prevalence of Autism Spectrum Disorders (ASD)

Lucija Tomljenovic (University of British Columbia, Canada)

14.25 Discussion

14.35 Platform 26

Aluminum, cognitive impairment and disability: an evidence-based approach.

Paolo Prolo (Swiss Disability Insurance, Bellinzona, Switzerland)

14.55 Discussion

15.05 Platform 27

Controversies concerning Alzheimer's disease and neurotoxic metal ion involvement: Evidence and insights

Maire Percy (University of Toronto, Canada)

15.25 Discussion

15.35 Platform 28

Requirements of aluminium chelators in clinical treatments

Guido Crisponi (University of Cagliari, Italy)

15.55 Discussion

16.05 Platform 29

Aluminium destabilizes neuronal calcium metabolism in a manner consistent with that in Alzheimer's disease.

Judie Walton (University of New South Wales, Sydney, Australia)

16.25 Discussion

16.35 Platform 30

Micro RNA (miRNA) complexity in Alzheimer's disease (AD) neocortex and in aluminum sulfate-stressed human astroglial (HAG) primary cell cultures; up-regulation of miRNA-125b and miRNA-146a

Walter Lukiw (Louisiana State University, USA)

16.55 Discussion

17.05 **TEA**

Final Session Chair: *Chris Exley* (Keele University, UK)

17.20 Introduction by the chair to the JD Birchall Memorial Lecture

17.25 The JD Birchall Memorial Lecture

Is The Aluminium in Your Drinking Water Safe!?

Professor Stephen Bondy

University of California, Irvine, USA

18.25 Discussion

18.35 **CONCLUSION OF MEETING**

20.00 Conference Dinner

ADDITIONAL POSTERS

Session 1 Aluminium Chemistry

1. Structure of Al-EDTA and Al-CyDTA complexes in aqueous solution

Takushi Yokoyama (Kyushu University, Hakozaki, Higashi-ku, Fukuoka, Japan)

Session 2 Environmental Aluminium Chemistry

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1. Aluminium forms and forest health in the Czech Republic

Ondřej Drábek (Czech University of Life Sciences, Prague, Czech Republic)

2. Comparison of soil characteristics and Al forms in forest soils with contrasting lithology

Ondřej Drábek (Czech University of Life Sciences, Prague, Czech Republic)

3. Speciation of aluminium in lake ecosystem of the Wielkopolski National Park, Poland

Anetta Ziola-Frankowska (Adam Mickiewicz University, Poznań, Poland)

4. Sorption of dissolved cationic aluminium species on some nano-sized metal oxides investigated for analytical purposes using atomic spectrometry

Peter Matus (Comenius University in Bratislava, Slovakia)

Session 3 Aluminium and Plants

1. Aluminium determination in soil where coffee crops are grown in Mexico

Teresa Hernández-Sotomayor (CICY, Mérida, Yucatán, México)

Session 4 Environmental Toxicity of Aluminium

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Session 5 Aluminium and Biochemistry

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1. Target of necrostatin-1 in Necrosis: necrotic pathway of neurodegenerative cell death induced by aluminum

Niu Qiao (Shanxi Medical University, Taiyuan, China)

2. Spectroscopic studies of nicotinamide adenine dinucleotide (NAD⁺) adsorbed at nano-aluminum(hydr) oxides/water interface

Xiaodi Yang (Nanjing Normal University, Nanjing 210097, China)

3. A TEM study of the interactions of aluminium and copper with serum amyloid protein (SAP) and beta amyloid (Ab₄₂).

Matthew Mold (Keele University, UK)

Session 6 Human Exposure to Aluminium

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1. Predictive score for aluminium hydroxide-induced macrophagic myofasciitis in vaccines with chronic myalgias

François-Jérôme Authier (Paris Est-Creteil University, France)

2. Blood metal levels in a colo rectal cancer (CRC) screened population

Salvatore Polizzi (San Remigio Hospital, Carignano, Torino, Italy)

Session 7 Human Toxicity of Aluminium

Session 8 Aluminium and Neurological Disease