The Aluminium Age

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http://www.keele.ac.uk/aluminium/

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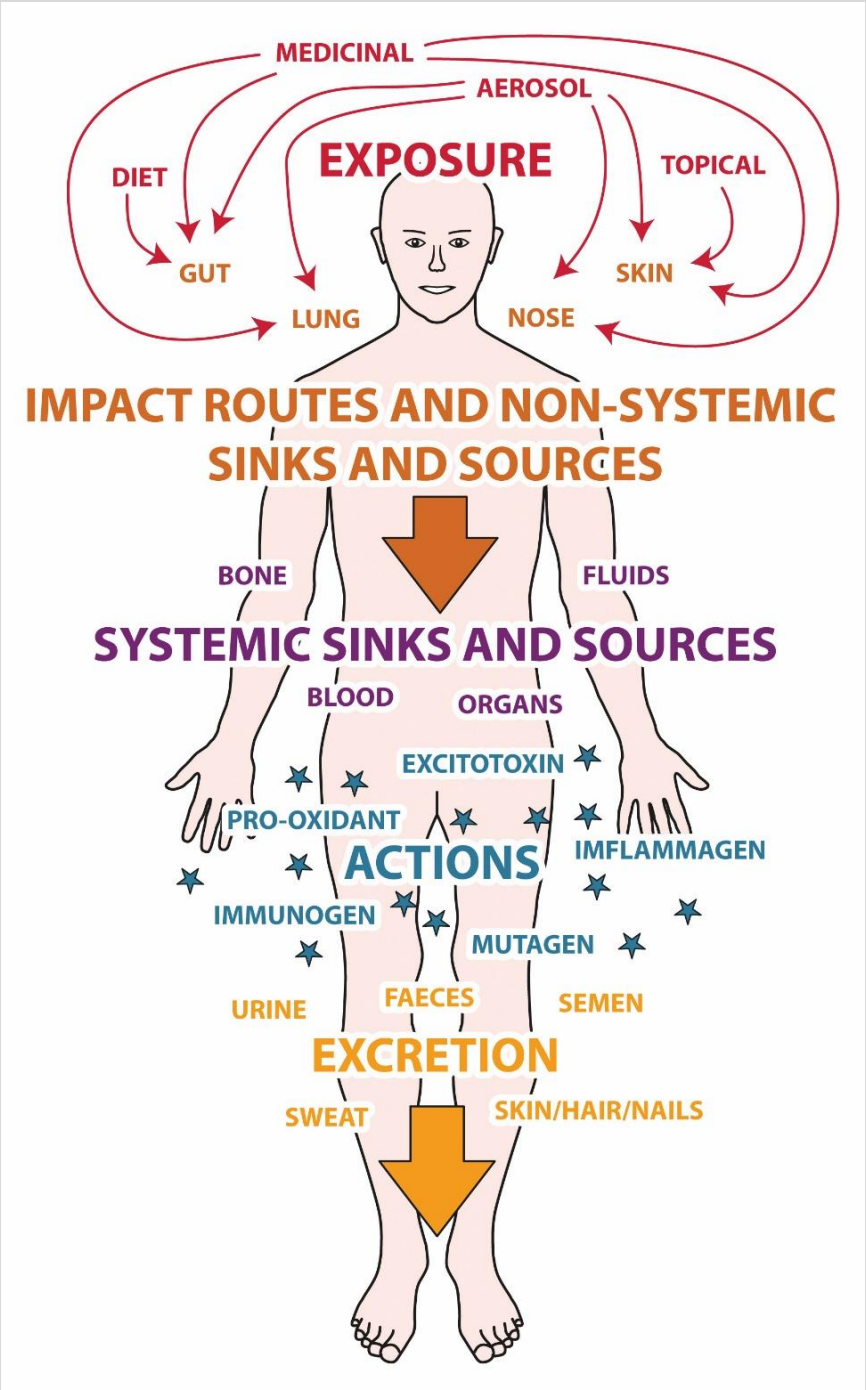

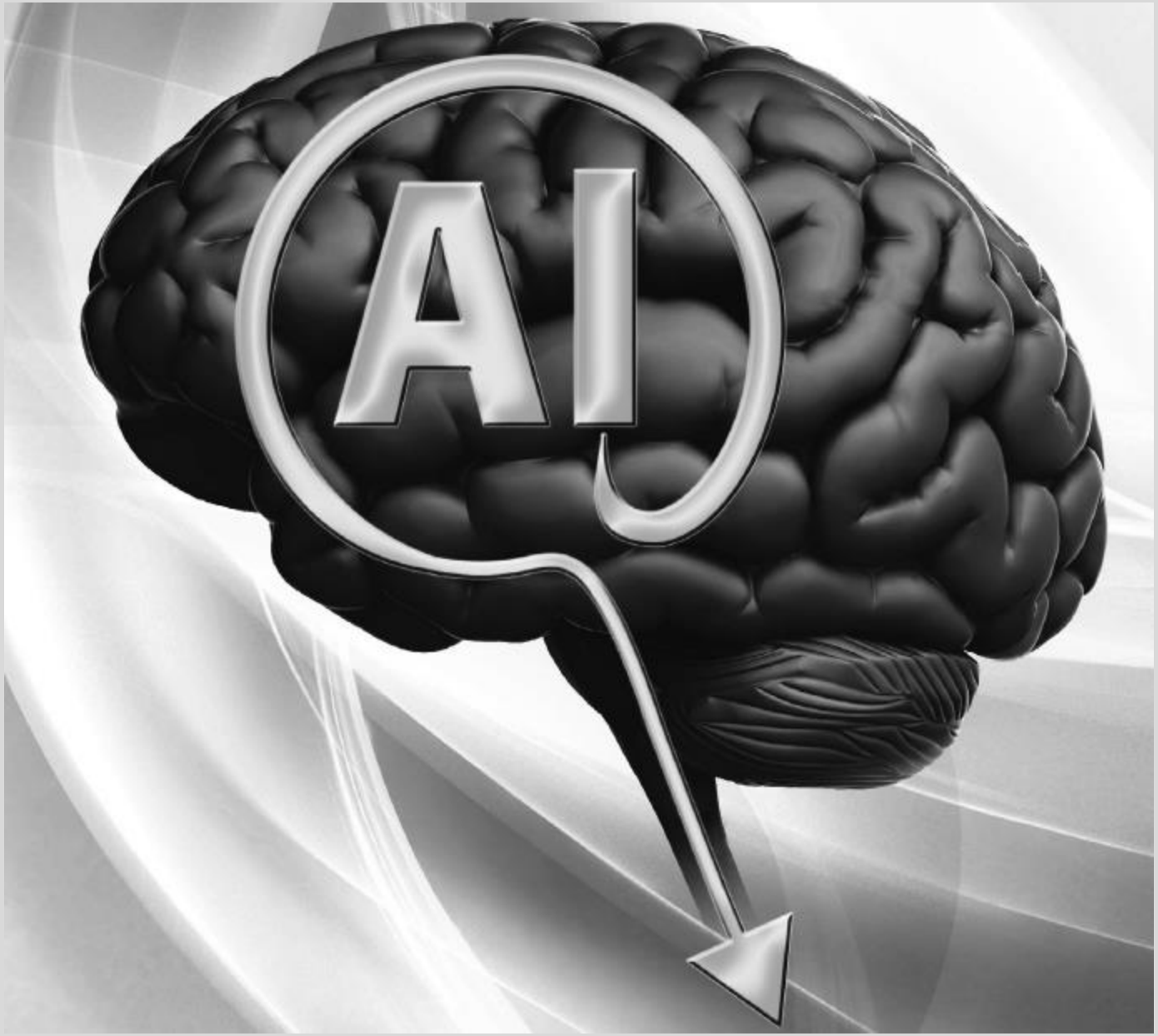
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Metallomics

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PAPER

Aluminium, iron and copper in human brain tissues donated to the medical research council's cognitive function and ageing study

Emily House,[a] Margaret Esiri,[b] Gill Forster,[c] Paul G Ince[c] and Christopher Exley*[a]

The median Al content of tissues from all **60 brains** (n=713) is 1 μg/g dry wt.

In 52 out of 60 individuals at least one tissue sample exceeded 2 μg Al/g dry wt.

In 41 out of 60 individuals at least one tissue sample exceeded 3.5 μg Al/g dry wt.

Approximately 70% of individuals aged 70 – 103 years had at least one tissue Al content which should be considered as pathological

Journal of Alzheimer's Disease 54 (2016) 1333–1338
DOI 10.3233/JAD-160648
IOS Press

The Identification of Aluminum in Human Brain Tissue Using Lumogallion and Fluorescence Microscopy

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[b]*Department of Clinical Neuropathology, King's College Hospital, London, UK*
[c]*MRC London Neurodegenerative Diseases Brain Bank, Institute of Psychiatry, Psychology and Neuroscience, King's College, London, UK*

https://content.iospress.com/articles/journal-of-alzheimers-disease/jad160648

Journal of Trace Elements in Medicine and Biology 40 (2017) 30–36

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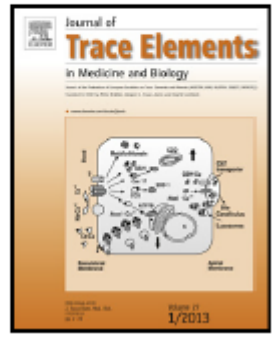

Toxicology

Aluminium in brain tissue in familial Alzheimer's disease

Ambreen Mirza[a], Andrew King[b,c], Claire Troakes[c], Christopher Exley[a,*]

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[b] Department Of Clinical Neuropathology, King's College Hospital, London, SE5 9RS, United Kingdom
[c] MRC London Neurodegenerative Diseases Brain Bank, Institute of Psychiatry, Psychology and Neuroscience, King's College, London, SE5 8AF, United Kingdom

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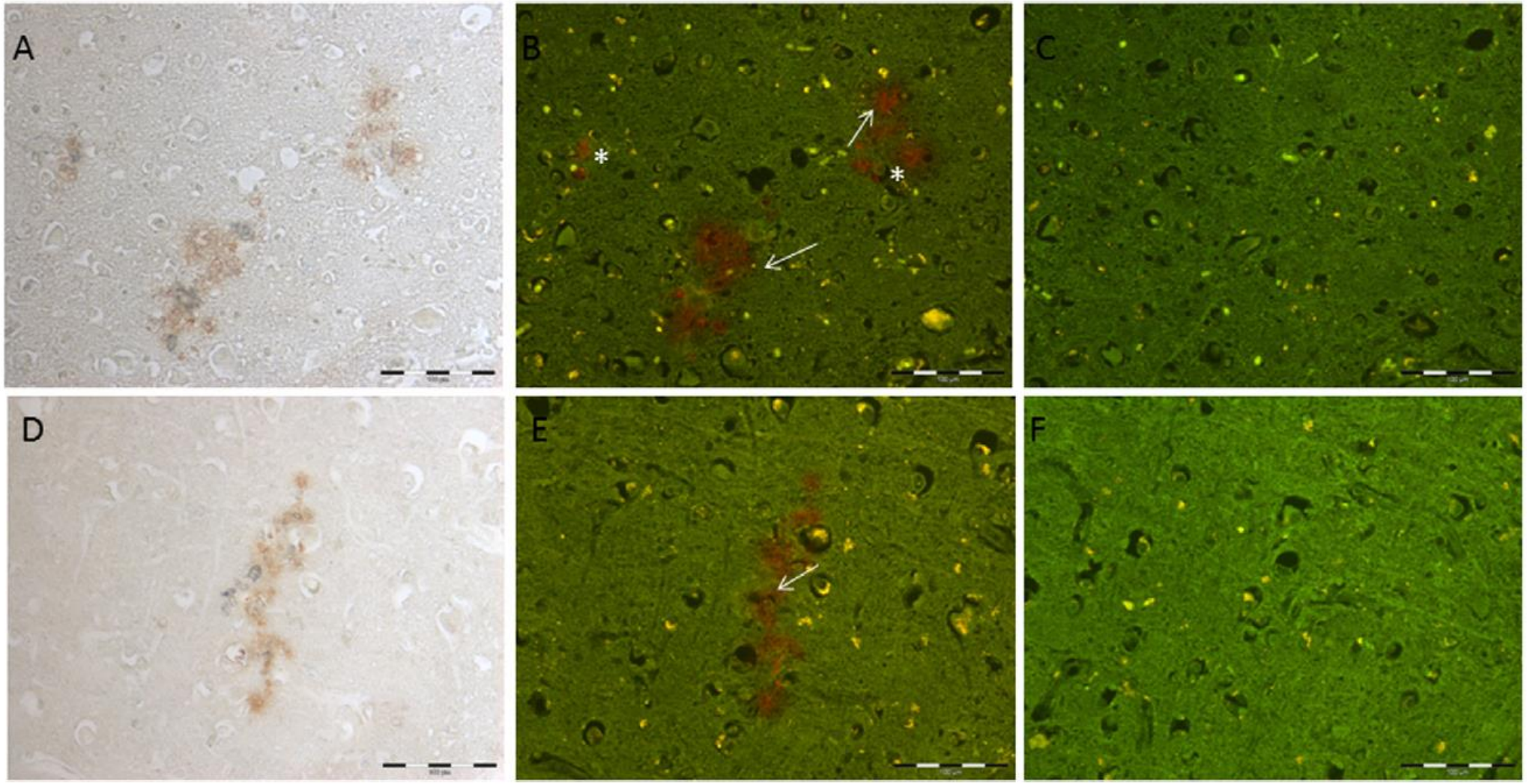

Fig. 1. Representative images of aluminium in frontal cortex. Light (A&D) and fluorescence (B&E) microscopy images of lumogallion-stained sections of frontal cortex. Asterisk label suggested intracellular deposits while arrows show diffuse deposits. Fluorescence microscopy of un-stained adjacent tissue sections (C&F) show autofluorescence. Scale bars are all 100 μm.

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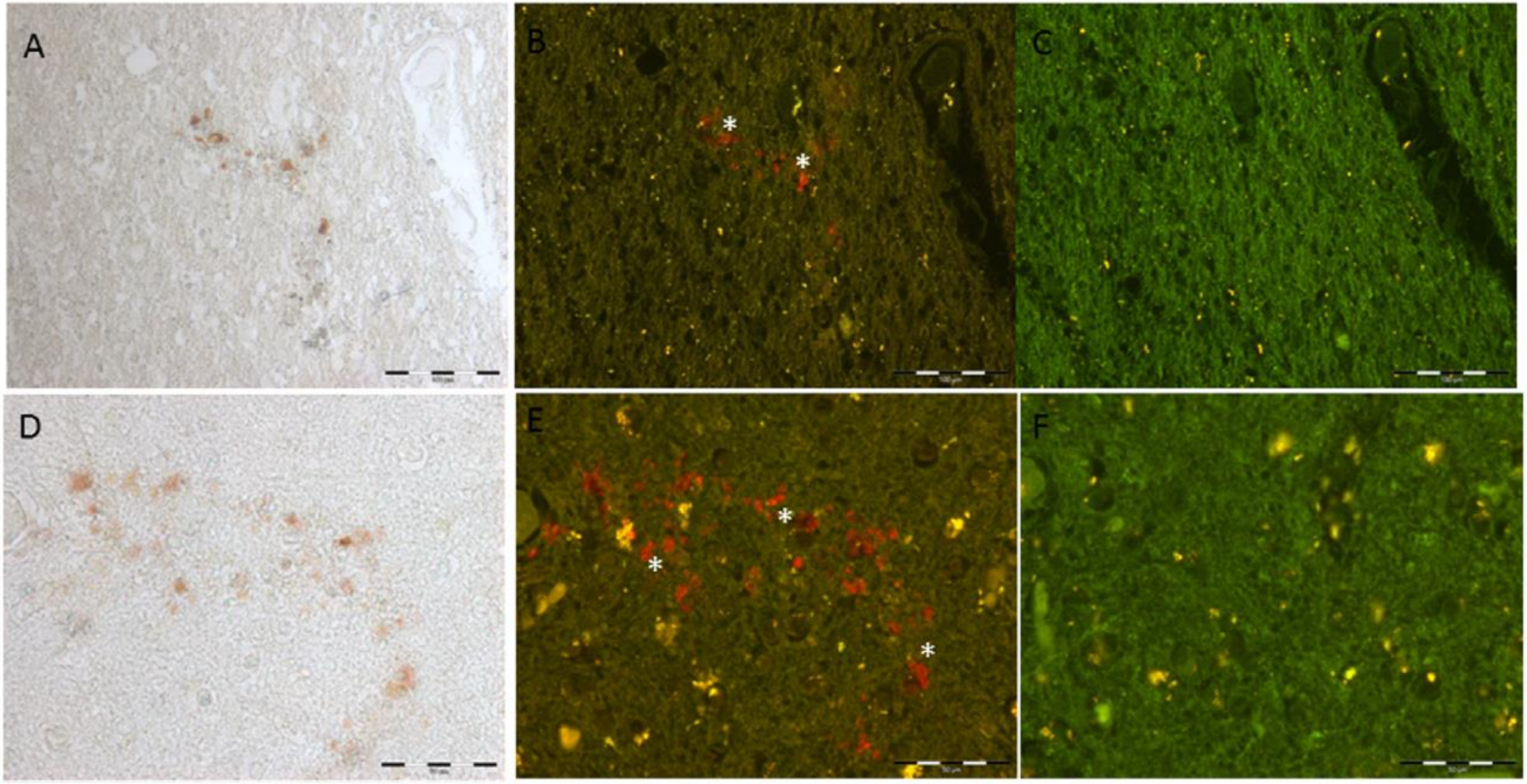

Fig. 2. Representative images of aluminium in parietal cortex. Light (A&D) and fluorescence (B&E) microscopy images of lumogallion-stained sections of frontal cortex. Asterisk label suggested intracellular deposits associated with both living and dead cells. Fluorescence microscopy of un-stained adjacent tissue sections (C&F) show autofluorescence. Scale bars are 100 μm (A–C) and 50 μm (D–F).

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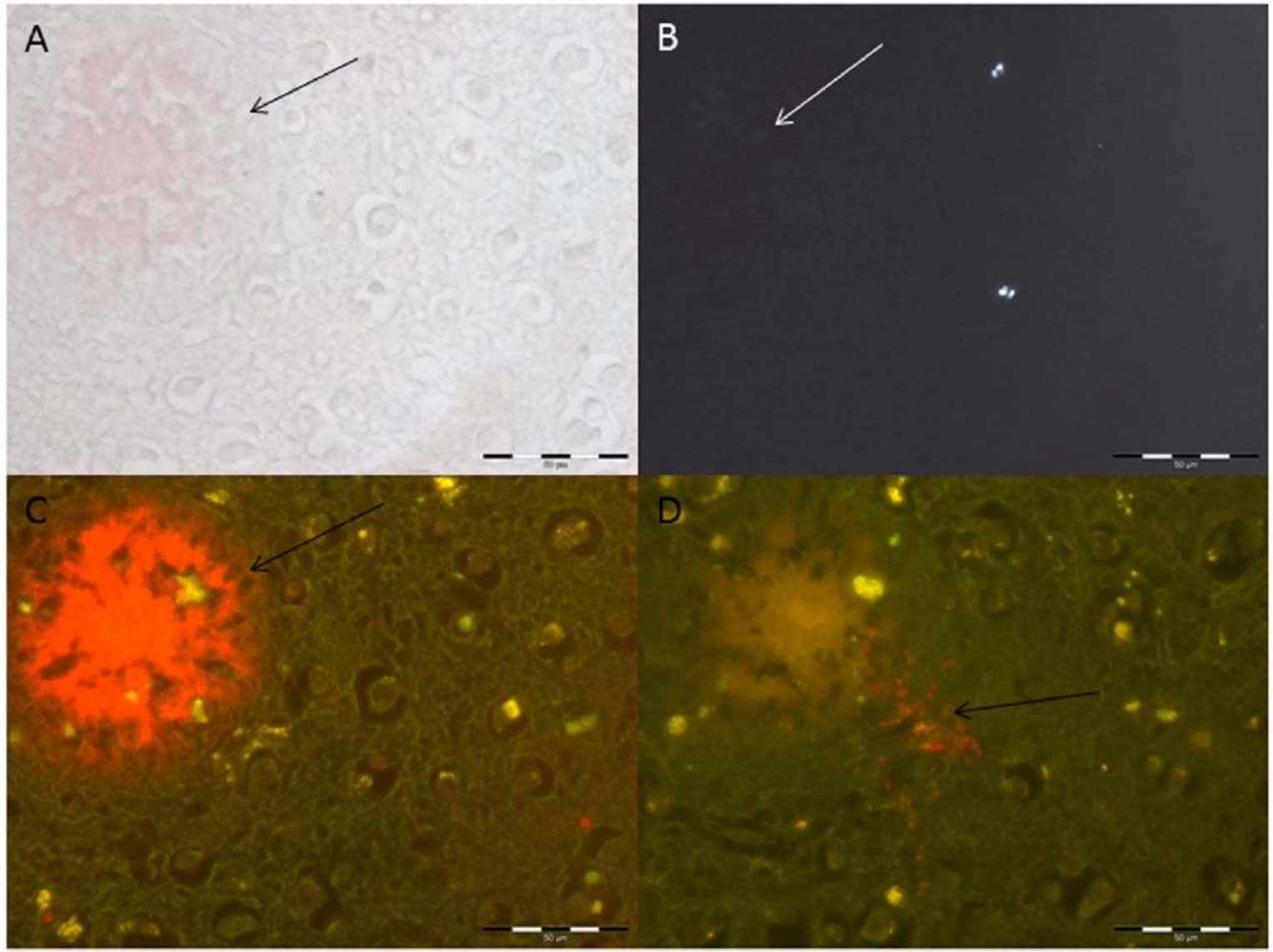

Fig. 4. Co-localisation of amyloid and aluminium in occipital cortex. (A) Light microscopy image of Congo red-stained tissue showing (arrow) senile plaque-like amyloid deposit. (B) Polarising microscopy image of Congo red-stained image showing (arrow) apple-green birefringence characteristic of amyloid in β sheet conformation. (C) Fluorescence microscopy image of Congo red-stained tissue showing (arrow) senile plaque-like amyloid deposit. (D) Fluorescence microscopy image of adjacent section of tissue stained with lumogallion and showing (arrow) significant deposits of aluminium. Scale bars are all 50 μm.

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International Journal of
Environmental Research and Public Health

MDPI

Article

Aluminium in Brain Tissue in Multiple Sclerosis

Matthew Mold [1], Agata Chmielecka [2], Maria Raquel Ramirez Rodriguez [1], Femia Thom [2], Caroline Linhart [3], Andrew King [4] and Christopher Exley [1,*]

https://www.mdpi.com/1660-4601/15/8/1777

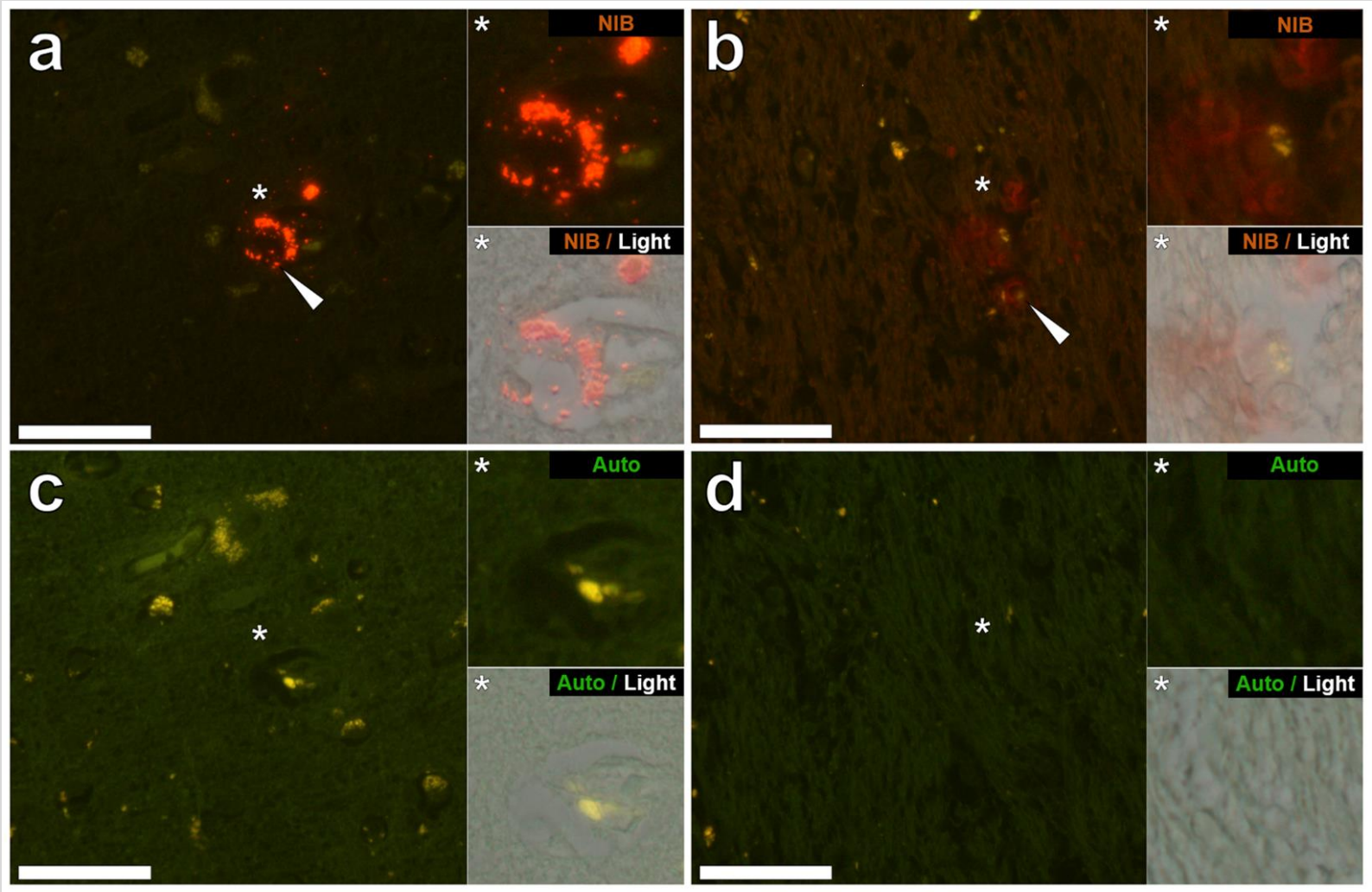

Figure 1. Extracellular aluminium in the frontal lobe and hippocampus of a 56-year-old male donor (MS274), diagnosed with RRMS. (**a**) Intense orange fluorescence (white arrow) indicating punctate deposits of aluminium was observed in the perivascular region of a small blood vessel in the white matter of the frontal lobe, in close proximity to lipofuscin, identified by yellow fluorescence. (**b**) Extracellular deposits of aluminium, identified as diffuse orange-red fluorescence, appear co-deposited with lipofuscin (white arrow) in white matter adjacent to the parahippocampal gyrus. (**c**,**d**) Autofluorescence of serial sections confirms the identity of aluminium in (**a**,**b**) respectively. Upper and lower panels depict magnified inserts of the fluorescence channel and bright field overlay. Magnification x400, scale bar 50 μm.

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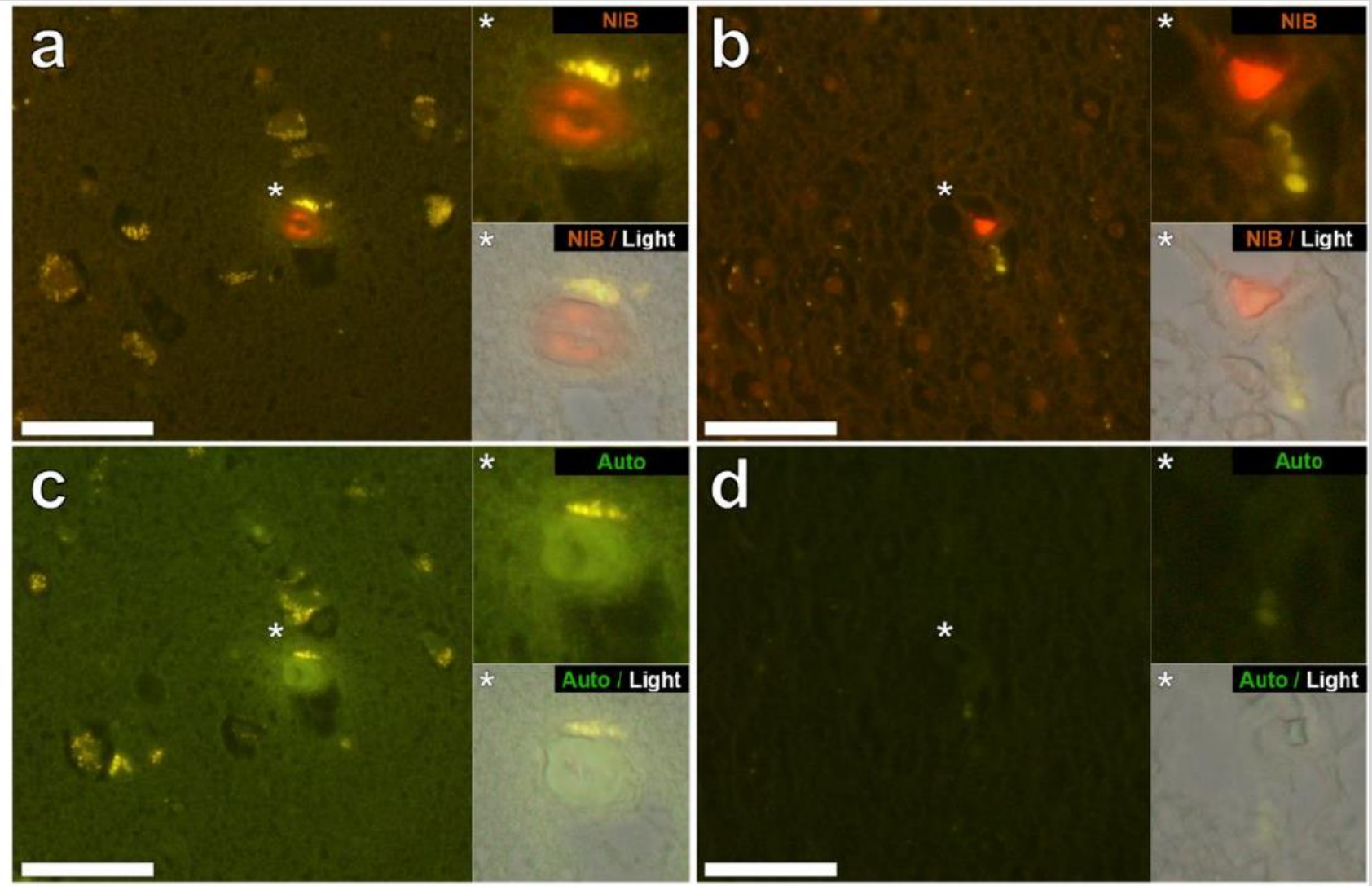
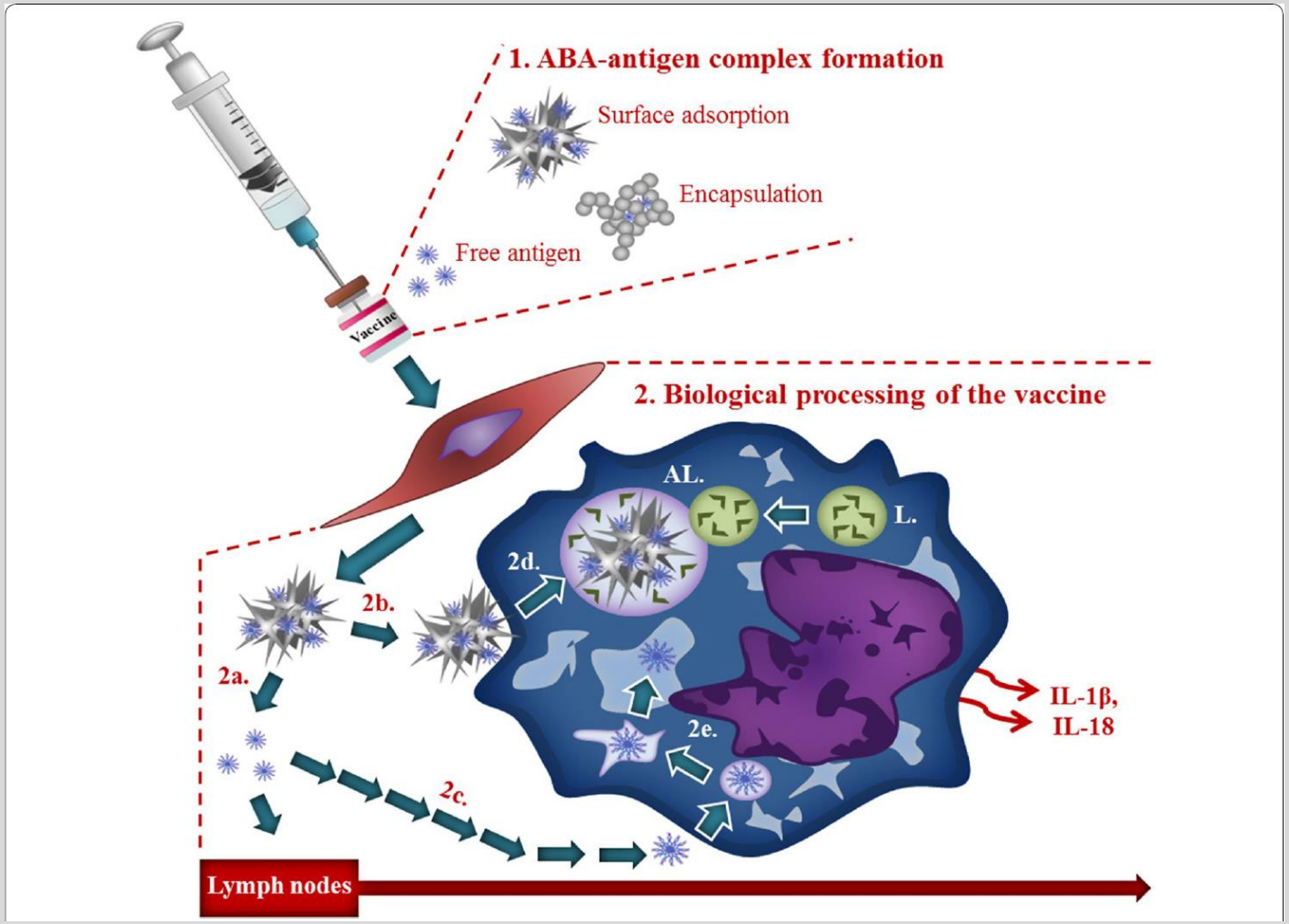


Figure 3. Aluminium in the frontal lobe and hippocampus of a 48-year-old female donor (MS317), diagnosed with SPMS. (**a**) Intense orange aluminium fluorescence was identified in refractile corpora amylacea (or mineralised deposits) in the frontal cortex grey matter). (**b**) Intracellular aluminium was also observed in occasional glial-like cells in the parahippocampal gyrus (white matter). Autofluorescence of serial sections (**c,d**) confirms the identity of aluminium in (**a**,**b**) respectively. Upper and lower panels depict magnified inserts of the fluorescence channel and bright field overlay. Magnification x400, scale bars: 50 μm.

https://www.mdpi.com/1660-4601/15/8/1777

What About the Cellular Response to Aluminium Adjuvants?

https://aacijournal.biomedcentral.com/articles/10.1186/s13223-018-0305-2



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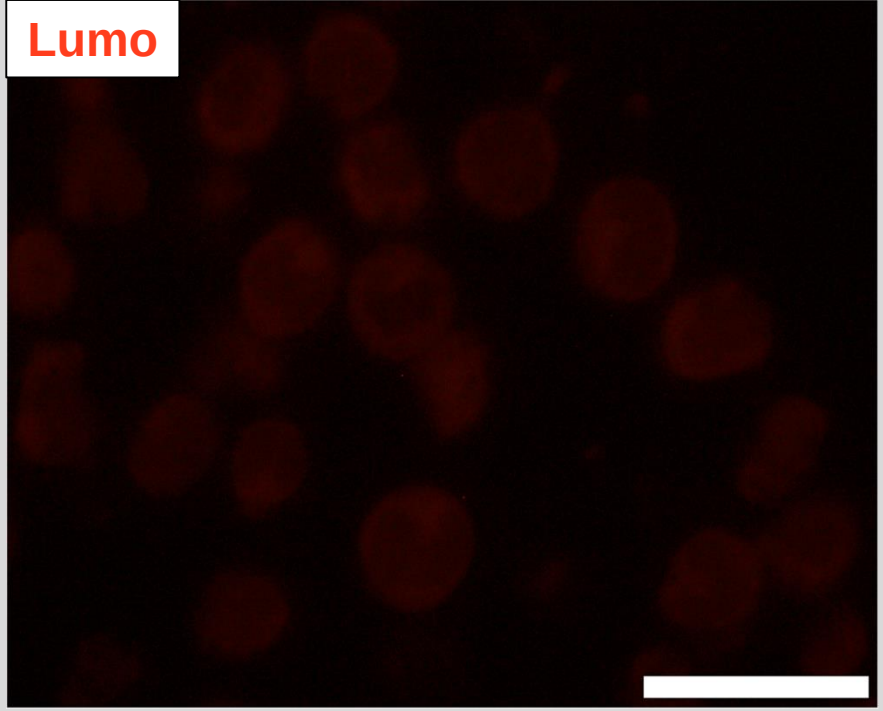
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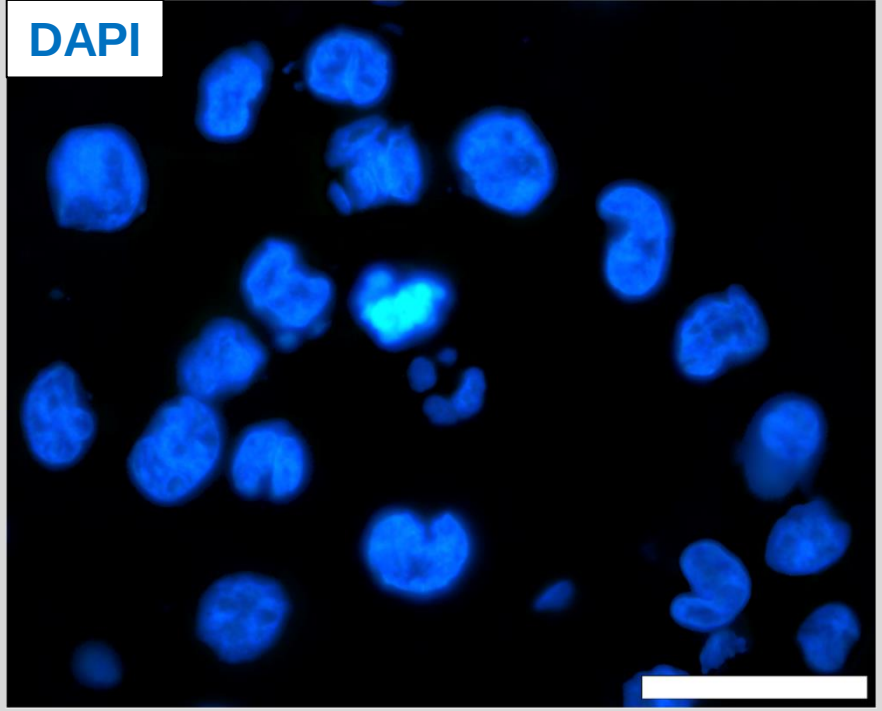
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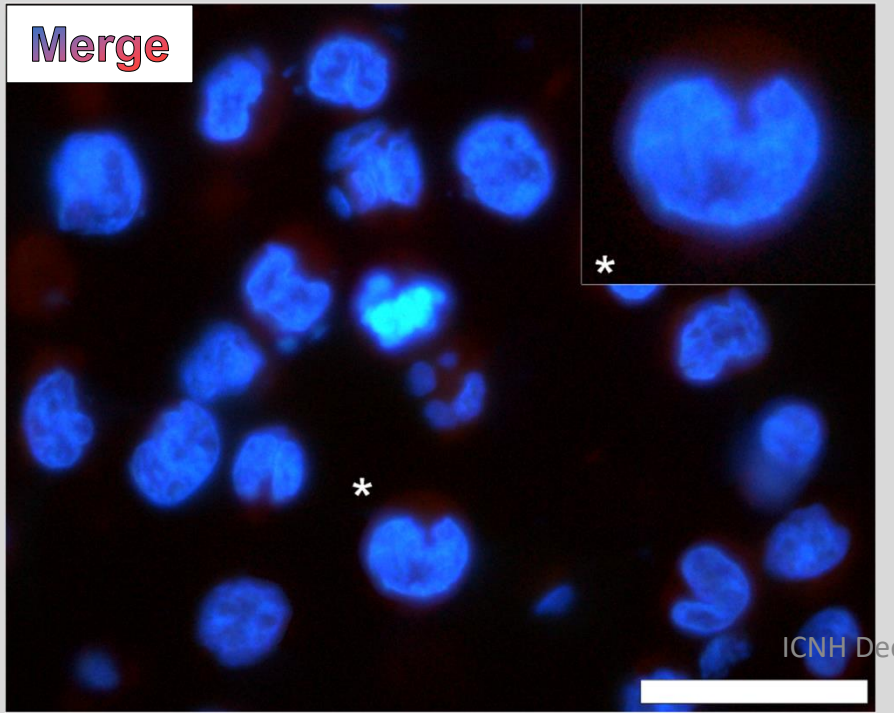
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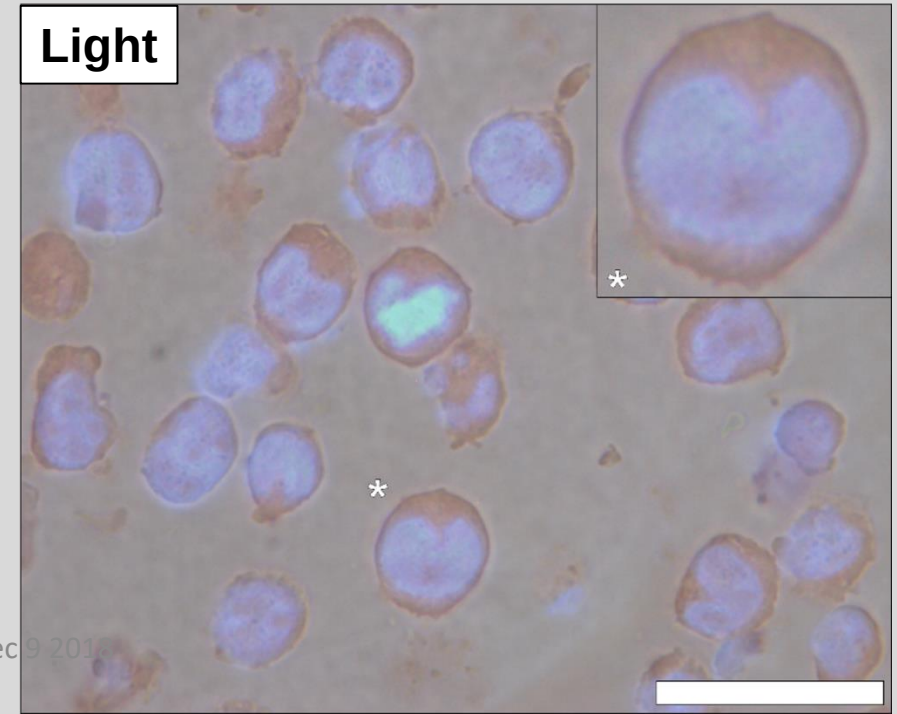
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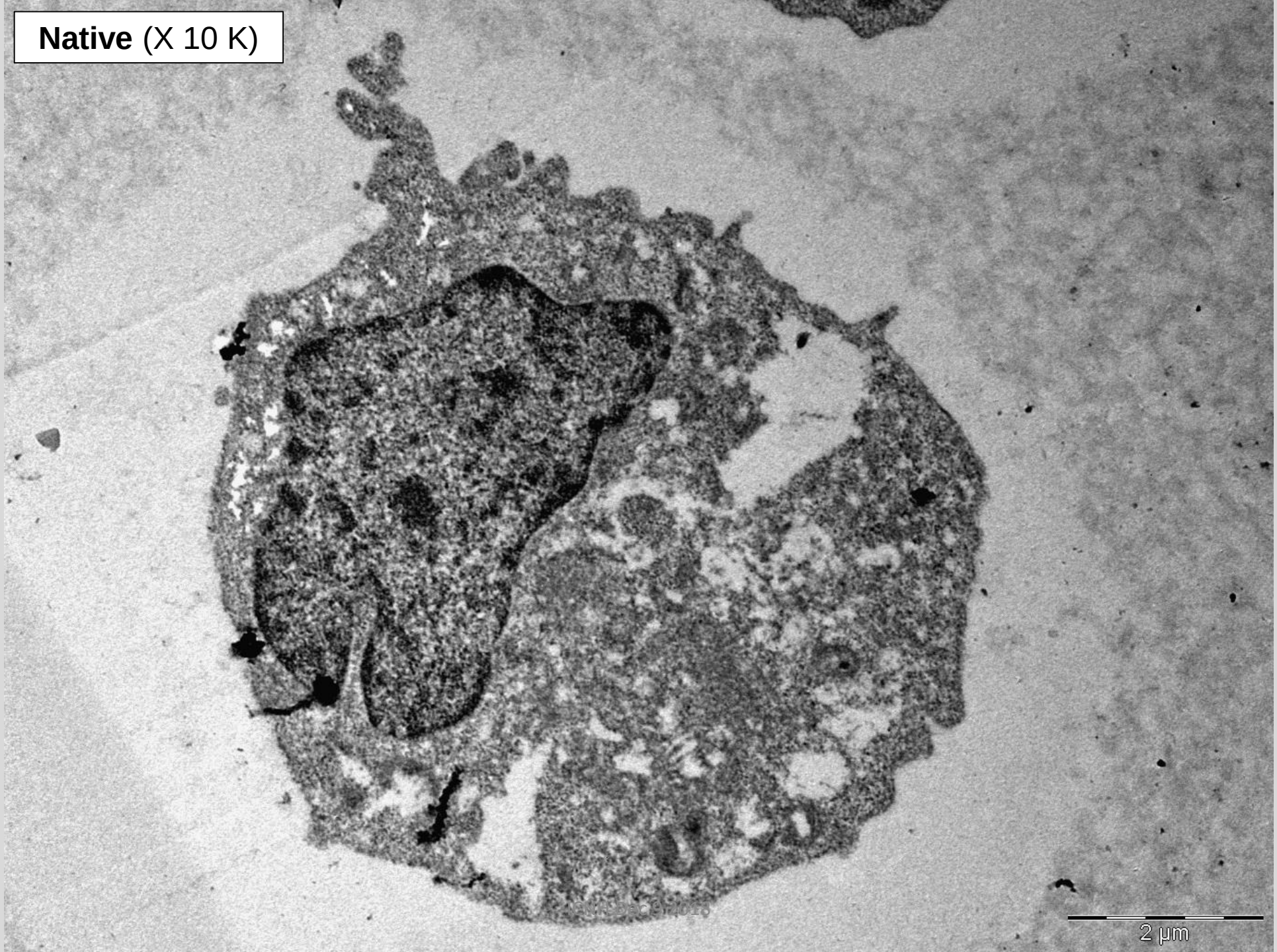
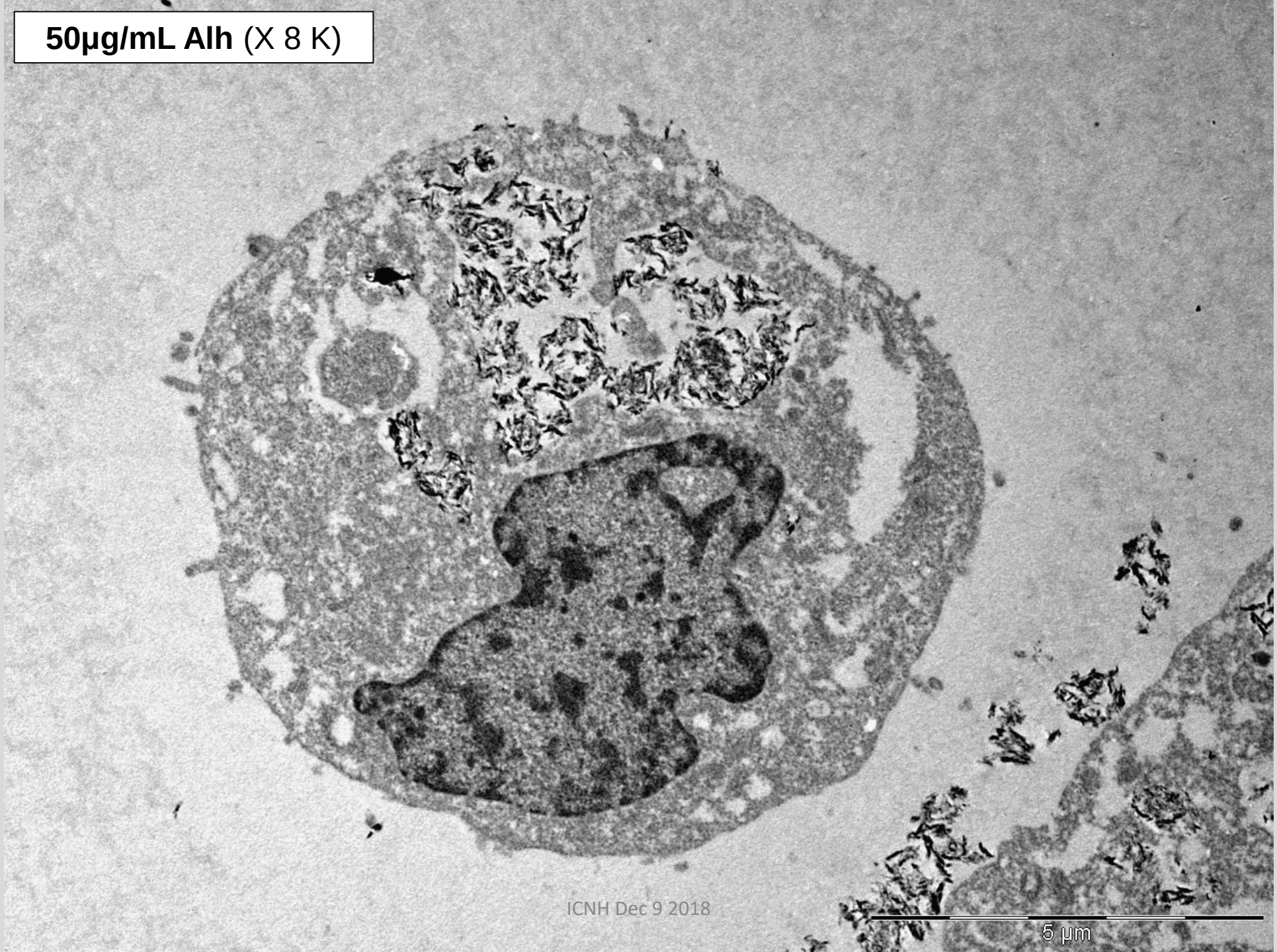
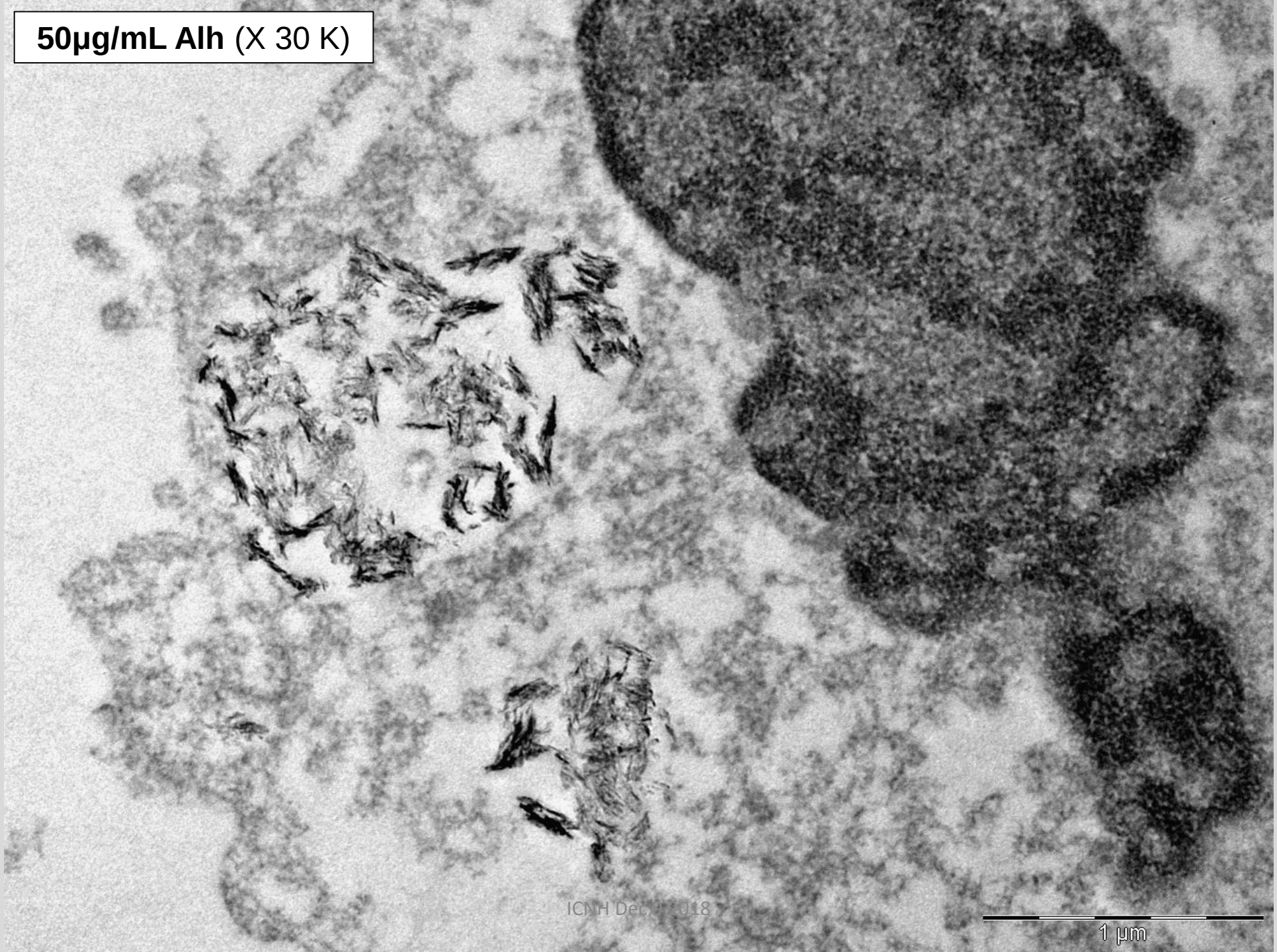

Native (X 10 K)
2 µm

Alhydrogel®

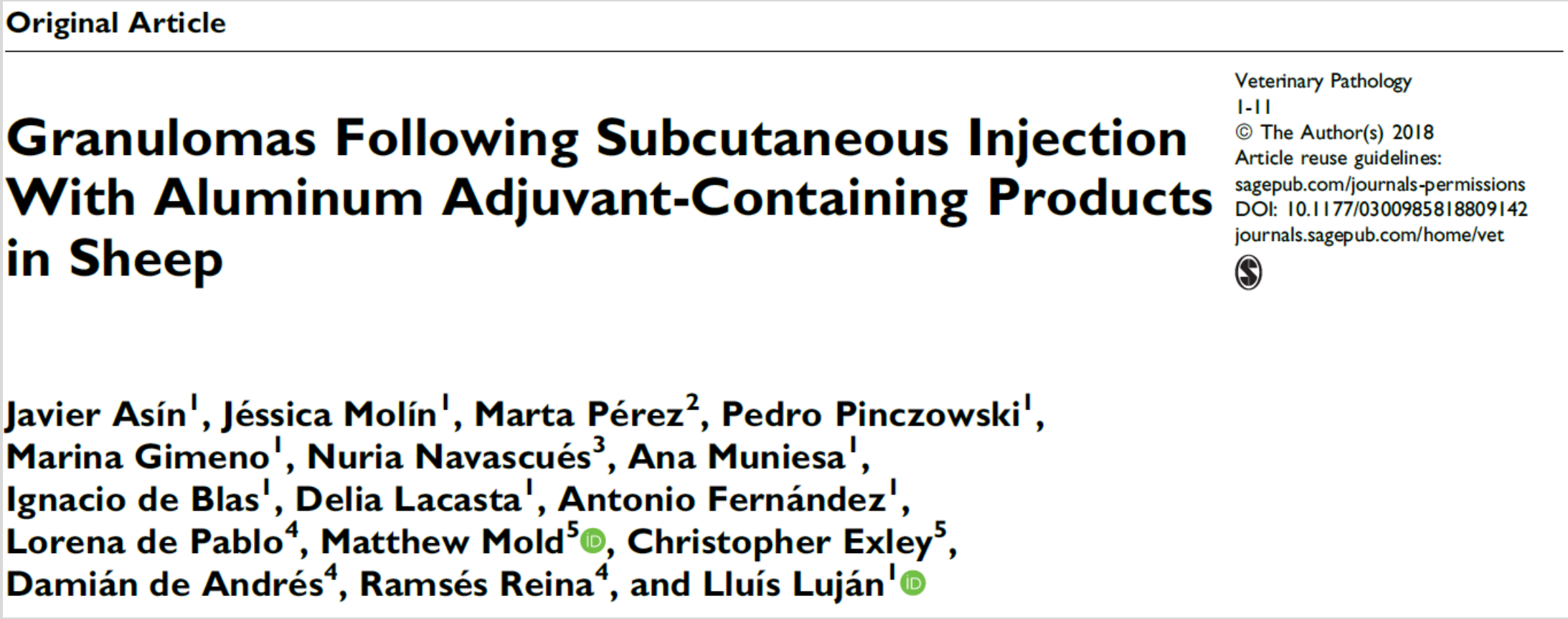
2.5 - 100 *µg/mL*

2.5µg/mL
25µg/mL
50µg/mL
100µg/mL


50µg/mL Alh (X 8 K)
ICNH Dec 9 2018
5 µm


50µg/mL Alh (X 30 K)
1 µm

Serious Adverse Events?



Original Article

Veterinary Pathology
1-11
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Granulomas Following Subcutaneous Injection With Aluminum Adjuvant-Containing Products in Sheep

Javier Asín[1], Jéssica Molín[1], Marta Pérez[2], Pedro Pinczowski[1], Marina Gimeno[1], Nuria Navascués[3], Ana Muniesa[1], Ignacio de Blas[1], Delia Lacasta[1], Antonio Fernández[1], Lorena de Pablo[4], Matthew Mold[5], Christopher Exley[5], Damián de Andrés[4], Ramsés Reina[4], and Lluís Luján[1]

http://journals.sagepub.com/doi/10.1177/0300985818809142

New and important research on sheep and recently published in the journal Veterinary Pathology now provides direct evidence of the fate of aluminium adjuvants following sub-cutaneous injection. The research confirms the **accumulation of aluminium adjuvant in lymph glands**. However, it also shows that while lymph glands are a target destination for aluminium adjuvant for the whole vaccine this is not the case when only the aluminium adjuvant is injected. Essentially the handling of aluminium adjuvant is different between whole vaccine and that which is mainly used as the control or placebo in vaccine safety trials. These seminal data for sheep raise new and important questions about how vaccine safety trials are conducted in humans and offer further insight into the role of aluminium adjuvants in serious adverse events following vaccination.

Journal of Trace Elements in Medicine and Biology 46 (2018) 76–82

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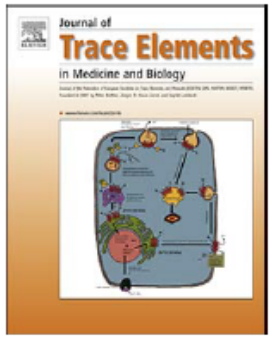

Aluminium in brain tissue in autism

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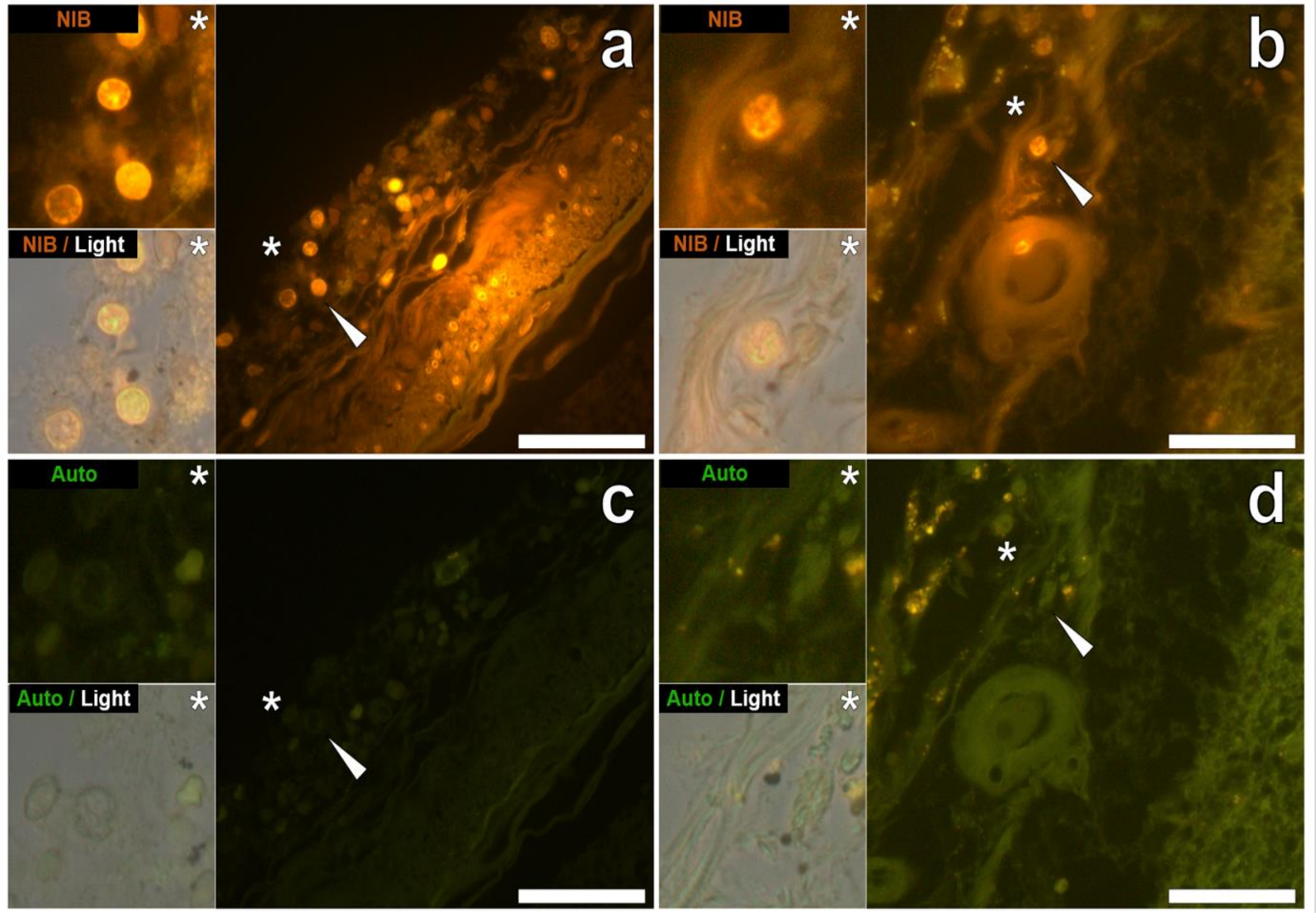

Intrameningeal lumogallion-reactive aluminium identified in the hippocampus **(a & c)** and frontal lobe **(b & d)** of a 50-year-old male donor diagnosed with autism.

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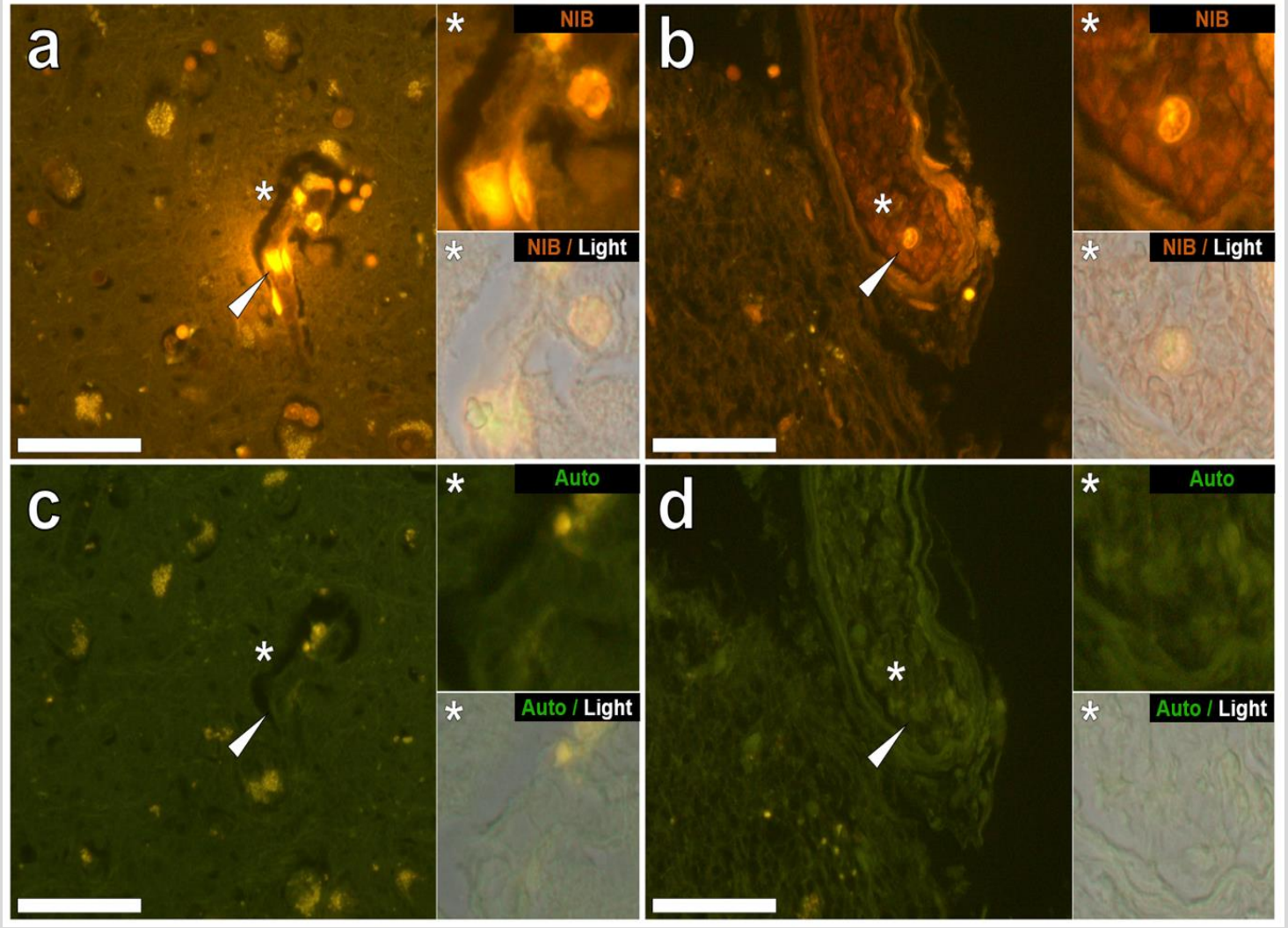

Intravasculature lumogallion-reactive aluminium identified in the hippocampus **(a – d)** of a 50-year-old male donor diagnosed with autism.

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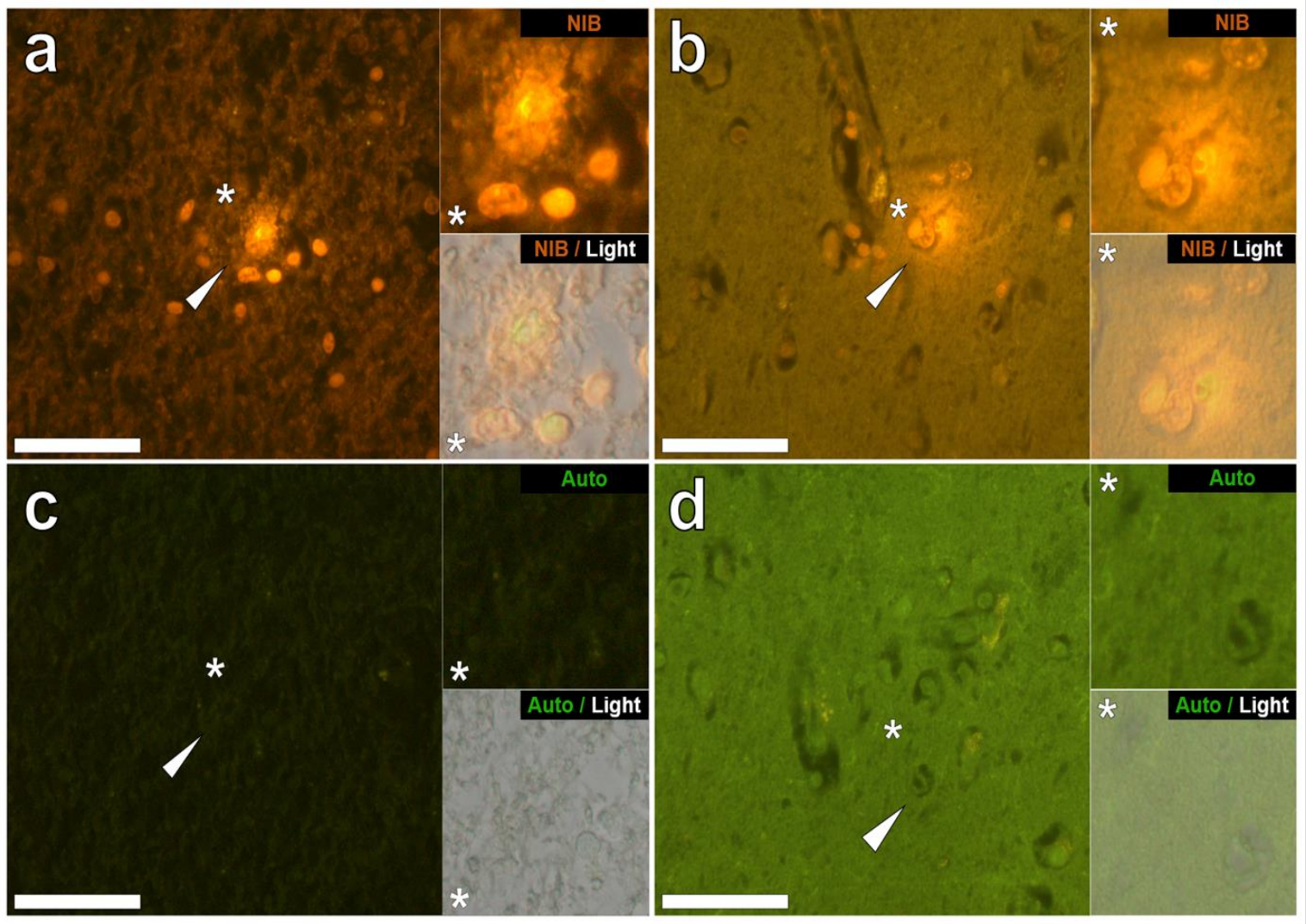

Lumogallion-reactive aluminium identified in the hippocampus **(a & c)** and parietal **(b & d)** lobe of a 15-year-old male donor diagnosed with autism.

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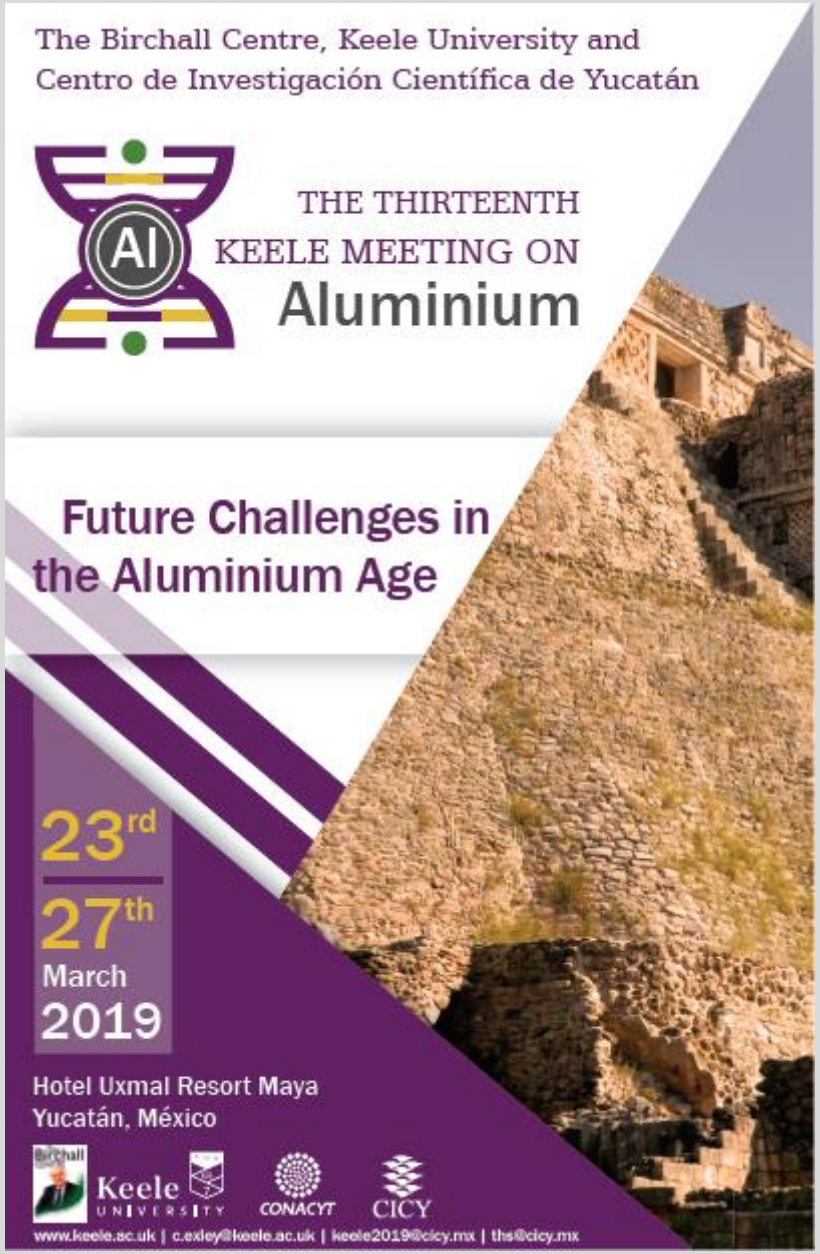
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