

Driving Alzheimer's research with trusted antibody solutions

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Advancing Alzheimer's disease research requires antibodies with exceptional specificity, reproducibility, and versatility, enabled through innovative engineering and rigorous validation. We highlight two complementary strategies: chimeric antibody technology and an enhanced validation framework tailored to disease-relevant contexts. Chimeric antibodies reduce cross-reactivity and enable multiplexed IHC for co-detection of neuronal, glial, and AD protein markers in FFPE tissues. This approach streamlines complex assays and improves spatial resolution in neurodegenerative studies. In parallel, IHC enhanced validation of isoform-specific APOE4 RabMab® ensures robust, low-background performance in clinically relevant settings. Together, these efforts underscore Abcam's commitment to delivering high-quality reagents that accelerate Alzheimer's disease research.

Chimeric antibodies

Chimeric antibodies (**Figure 1**), engineered by fusing the variable (antigen-binding) domains of one species (e.g., rabbit) with the constant domains of a different species, represent a significant advancement in antibody technology. Their species-specific constant regions allow for the simultaneous use of multiple primary antibodies. This offers notable benefits in *in vitro* diagnostic and research applications.

With a focus on neurodegenerative disease (ND), we have utilized a diverse range of species backbones, including mouse (IgG1, IgG2a), rat (IgG2a), chicken (IgY), and goat (IgG), to demonstrate this in immunohistochemistry (IHC) in both normal human brain and ND disease brain.

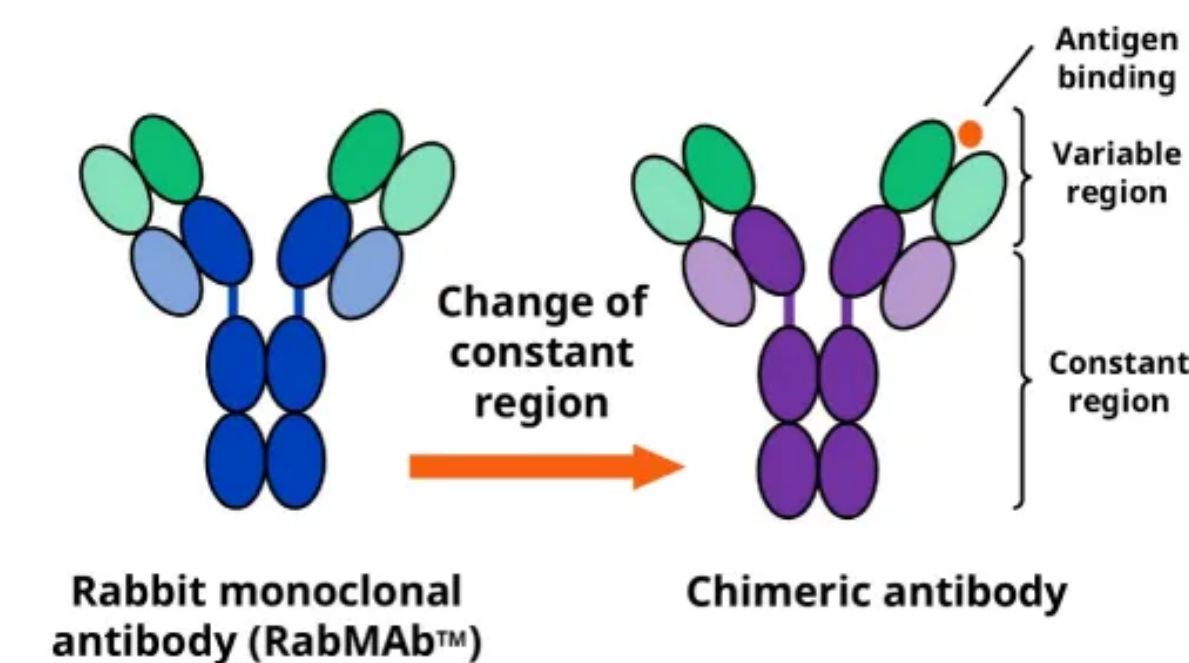


Figure 1: Diagram of a chimeric antibody. Retaining the antigen binding region but changing the constant region to a different species.

Results – Follow the clone

Three 4 colour Formalin-fixed paraffin-embedded immunohistochemistry (IHC-P) panels of neuronal relevant targets were generated in human cerebral cortex sections.

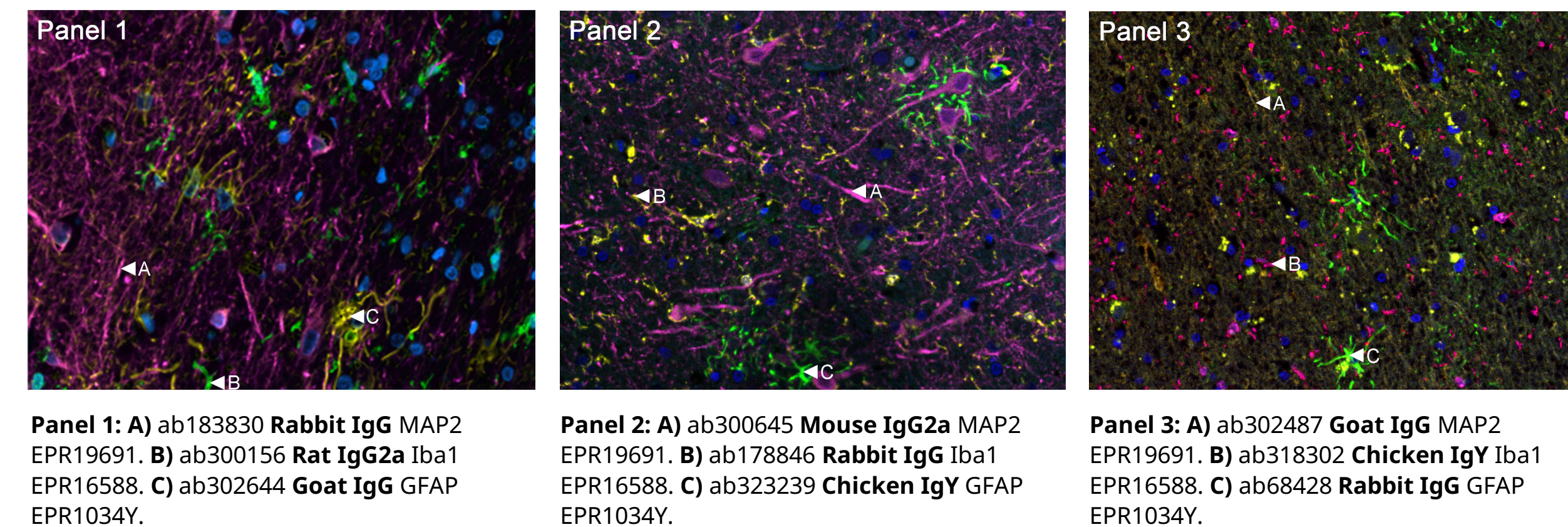


Figure 2: Three IHC-P panels of MAP2, Iba1, and GFAP antibodies. Staining human cerebral cortex, performed on the Leica BOND™ RX. Images were acquired with a confocal microscope (Leica-Microsystems, TCS SP8) or the EVOS™ S1000 Spatial Imaging System (ThermoFisher Scientific). The same clone was used for each target between panels.

Alzheimer's disease (AD) targets

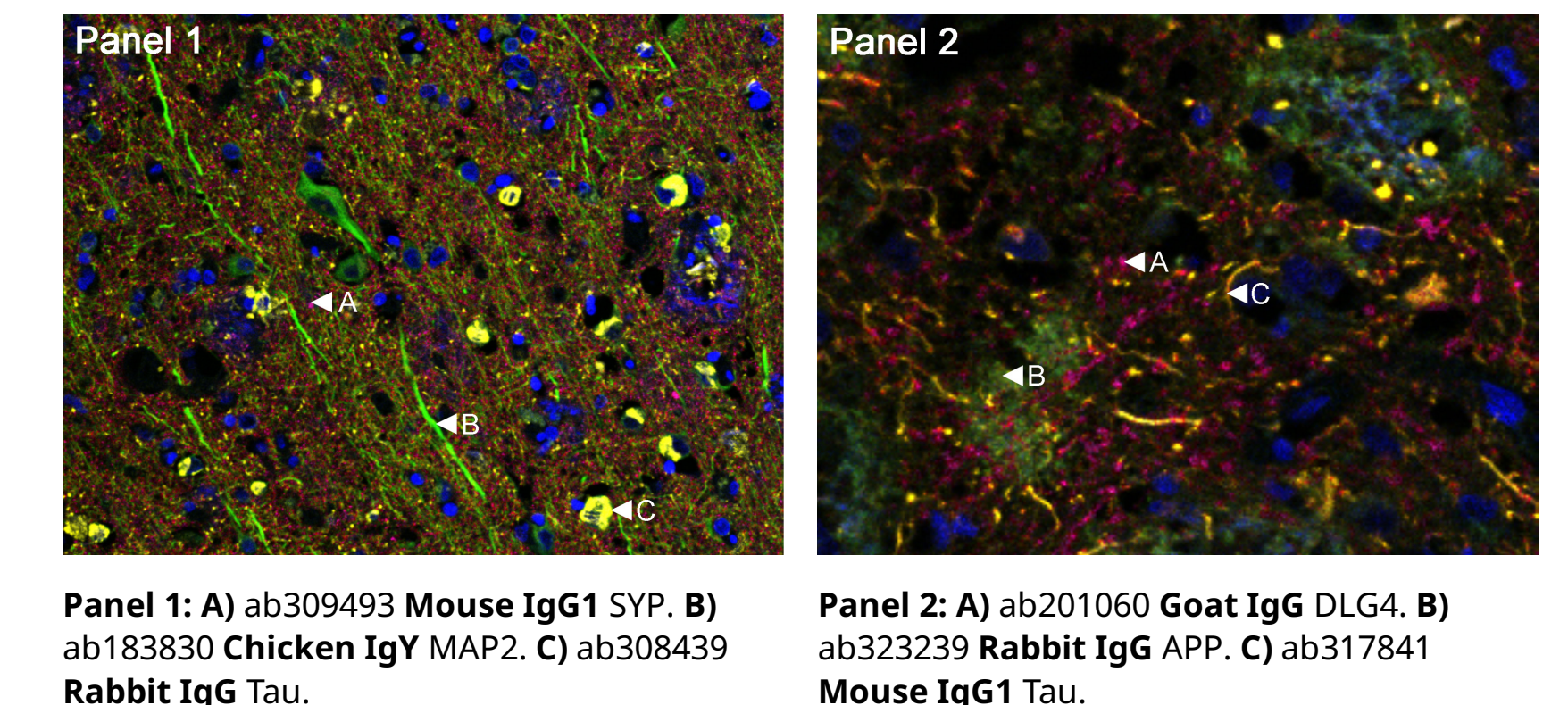


Figure 3: AD panels. Two IHC-P panels of different combinations of antibodies staining human AD brain. Performed on the Leica BOND™ RX

IHC Enhanced validation

Enhanced Validation is designed to give you unmatched confidence in antibody clone selection by delivering comprehensive insights into the specificity and sensitivity of our recombinant antibodies in immunohistochemistry (IHC). Tailored to your target and research needs, we generate detailed IHC expression profiles using FFPE tissues and commercial tissue microarrays (TMAs).

We incorporate formalin-fixed paraffin-embedded (FFPE) cell lines (knockout/overexpression), chromogenic multiplex assay, peptide blocking assays, and ELISA to ensure optimal performance, reducing risk and delivering robust, reproducible results.

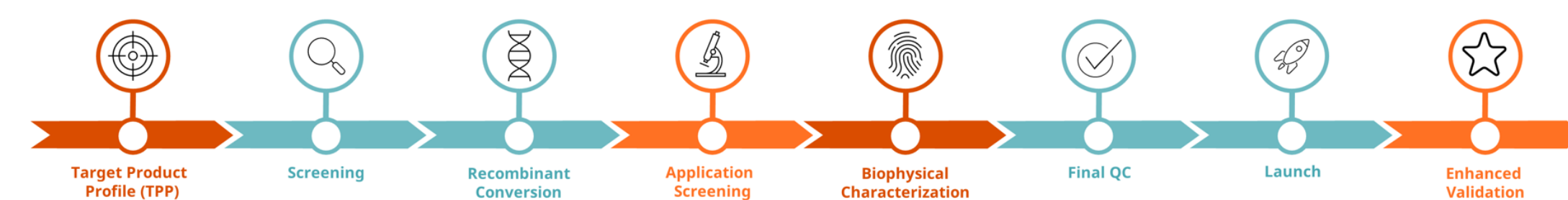


Figure 4. Antibody validation: from start to finish. As part of our commitment to raising quality standards, our enhanced validation is a rigorous initiative that demonstrates antibody performance in conditions that closely mirror your laboratory environment, ensuring reliability, reproducibility, and confidence in every experiment

Specificity of anti-APOE4 antibody

Below are representative images showing APOE2, APOE3, and APOE4 OE in FFPE 293T cells (human embryonic kidney epithelial). APOE4 expression was observed in the APOE4-OE and absent in the APOE2- and APOE3-OE cell lines. The anti-APOE4 antibody doesn't cross-react with other APOE isoforms.

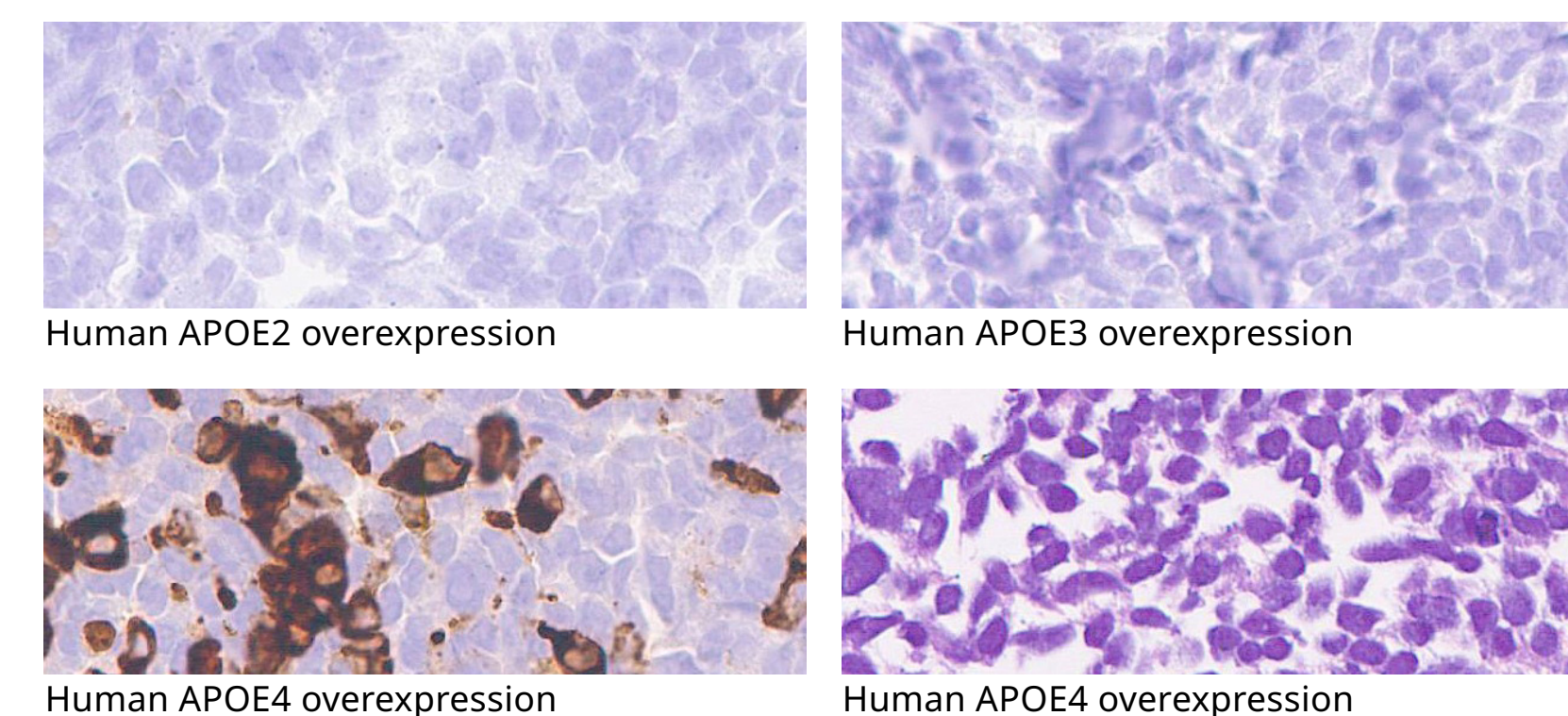


Figure 5. Immunohistochemical analysis of APOE4 expression in FFPE 293T cells using Anti-APOE4 antibody [EPR24181-64] ab279714 at a concentration of 1/1000 (a-c) or secondary only antibody control (d). Positive staining in brown; nuclear hematoxylin in blue.

Detection of APOE4 expression in Alzheimer's

Below are the representative images from eight donors with Alzheimer's disease showing varied APOE4 expression within Aβ plaques and neurovascular compartments.

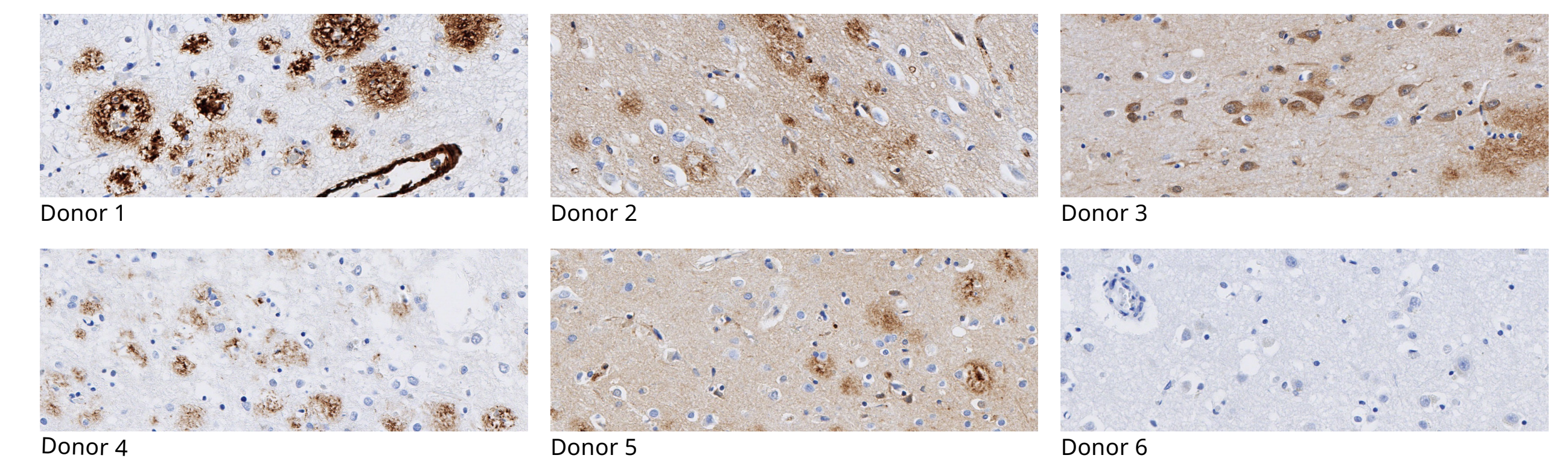


Figure 6. APOE4 expression in Alzheimer's disease. IHC staining of Alzheimer's brain tissues using Anti-APOE4 antibody [EPR24181- 64] ab279714 at a concentration of 0.25 µg/mL. Positive staining in brown; nuclear hematoxylin in blue.