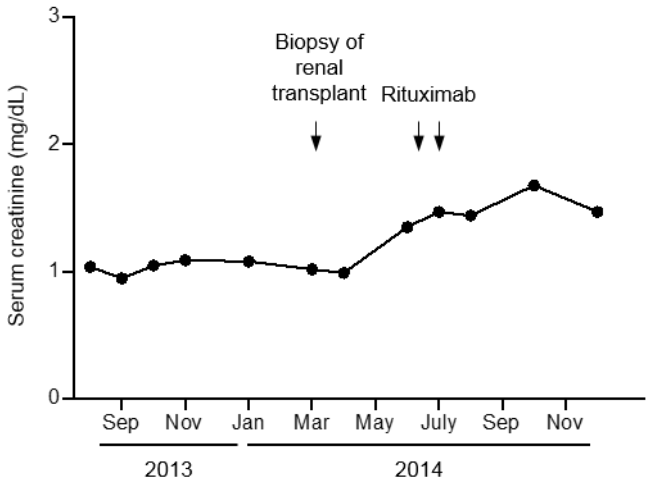
## Supplemental material

### Supplemental Table 1

| | Native biopsy | Transplant biopsy |
|---|---|---|
| IgG subclass presence | IgG1 and IgG4 | IgG1 |
| Complement positivity | C3 and C4d | C4d |
| Electron microscopy performed | Yes | No |
| MN stadium according to Ehrenreich and Churgh | 2 | - |
| Enhanced $PLA_2R1$ staining | No | No |
| Enhanced THSD7A staining | Yes | Yes |

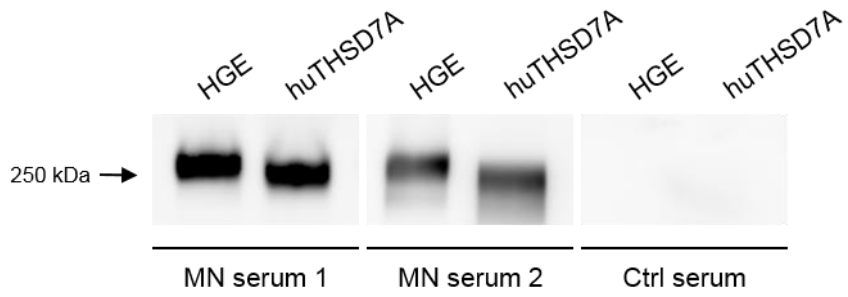
Biopsy findings in the native kidney biopsy in 2004 and the transplant biopsy in 2014.

### Supplemental Figure 1




Serum creatinine levels in the patient after kidney transplantation due to MN-associated end-stage renal disease.

**Supplemental Figure 2**



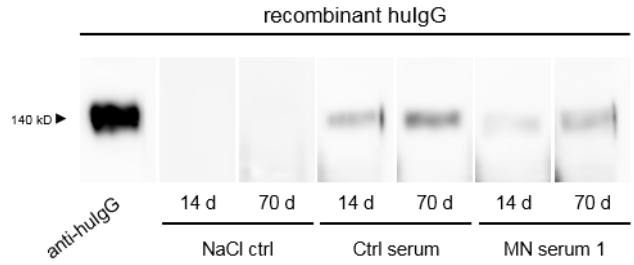

Results of Western blotting of human glomerular extracts (HGE) and recombinant human THSD7A (huTHSD7A) with sera from two different patients with anti-THSD7A antibody-positive MN and one healthy donor. Both sera recognize a 250 kDa protein present in HGE, corresponding to THSD7A, as well as recombinant huTHSD7A.

**Supplemental Table 2**

| | **MN 1** | **MN 2** |
|---|---|---|
| **Patient characteristics** | | |
| Gender | F | F |
| Age | 30 | 29 |
| Proteinuria at serum withdrawal (g/g albumin-to-creatinine) | 3.4 | 7.1 |
| Anti-THSD7A titer according to IFT | 1:1000 | 1:320 |
| **Biopsy findings** | | |
| Granular IgG staining | Yes | Yes |
| C1q positivity | Yes | Yes |
| C3 positivity | Yes | Yes |
| Enhanced $PLA_2R1$ staining | No | No |
| Enhanced THSD7A staining | Yes | Yes |
| Electron microscopy performed | Yes | Yes |
| MN stadium according to Ehrenreich and Churgh | 1 | 1 |

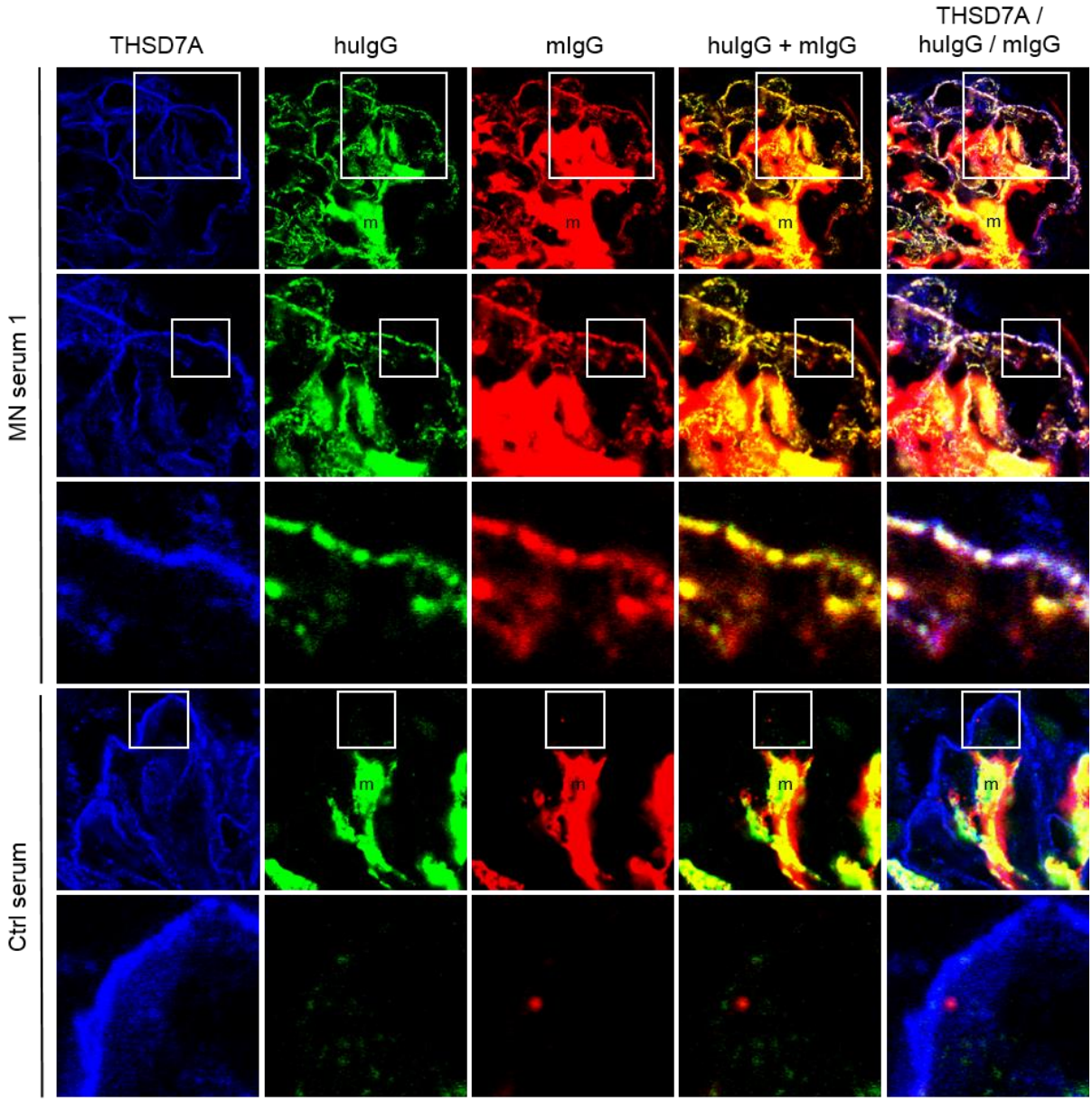
Clinical characteristics and biopsy findings of the patients whose sera were used for animal experiments.

**Supplemental Figure 3**



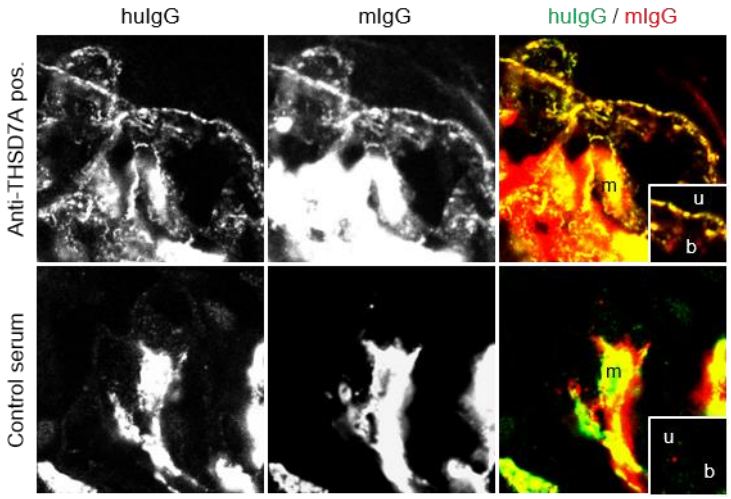

Immunoblots of recombinant huIgG with specific anti-huIgG antibody or serum from mice that were either injected with sodium chloride (NaCl ctrl) or serum from a healthy individual or from a patient with anti-THSD7A antibody-containing MN. d, days.

**Supplemental Figure 4A**



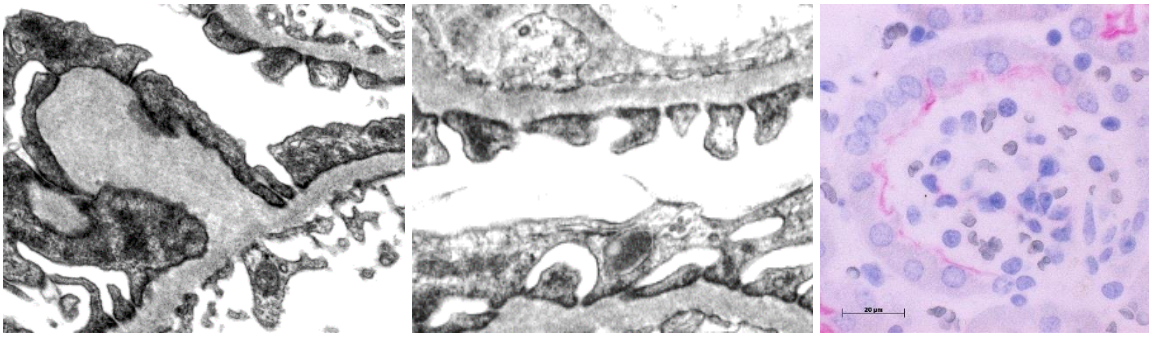

Immunofluorescent staining for THSD7A, human IgG (huIgG), and mouse IgG (mIgG) in kidney samples from mice 70 days after intraperitoneal injection of either anti-THSD7A antibody-containing serum or control serum. HuIgG colocalizes with THSD7A and mIgG in the mouse that was injected with anti-THSD7A antibody-containing serum, suggesting the presence of immune complexes containing THSD7A, human anti-THSD7A antibodies and mouse anti-huIgG. Only unspecific mesangial deposition (m) of huIgG and mIgG is seen in the mouse that received serum from a healthy individual.

**Supplemental Figure 4B**



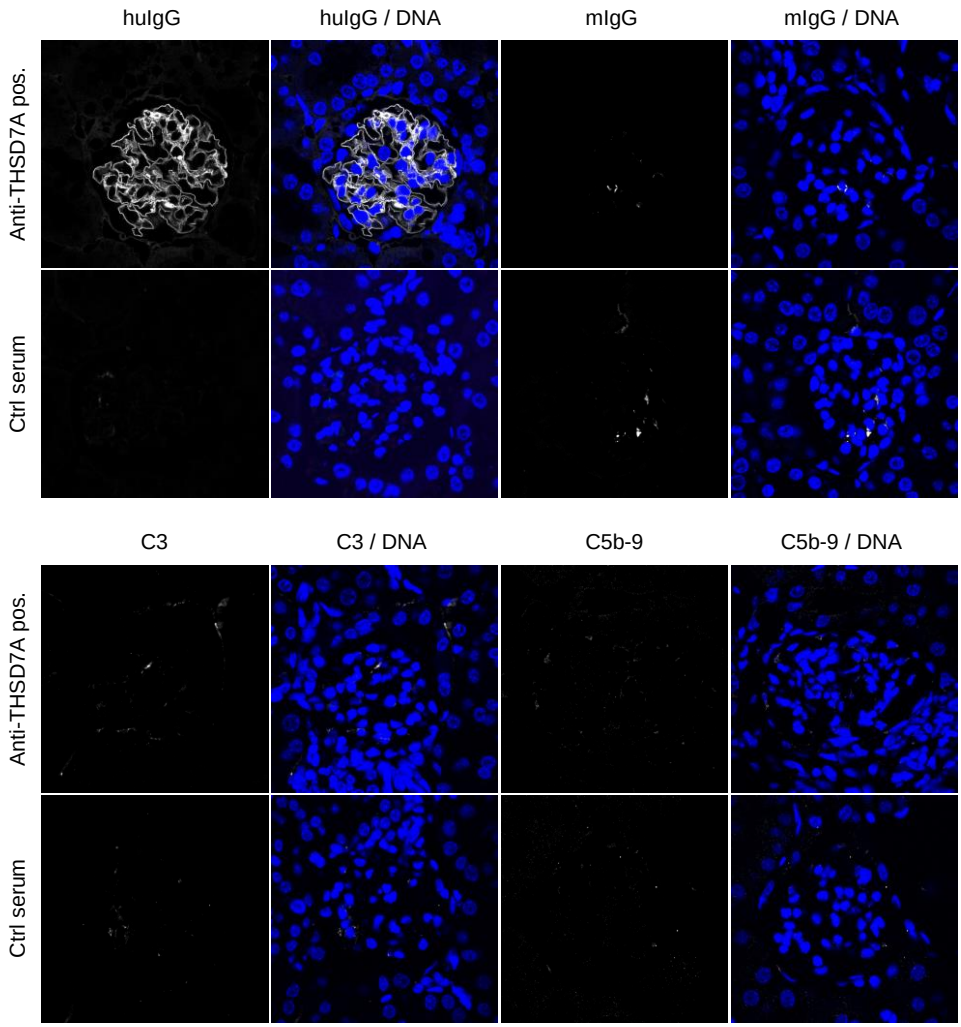

Greyscale images of immunofluorescent staining for human IgG (huIgG) and mouse IgG (mIgG) corresponding to the colored images from Supplemental Figure 4A.

**Supplemental Figure 5**



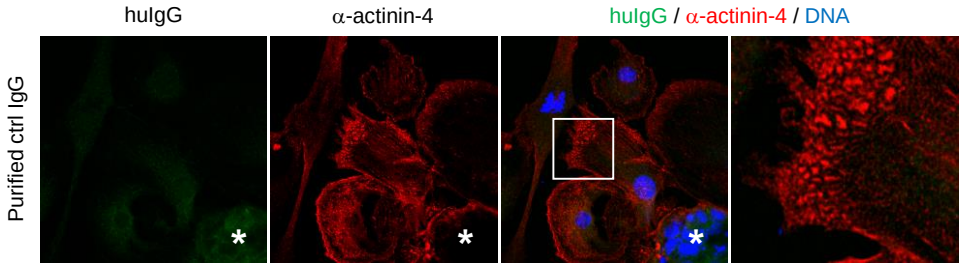
Electron microscopic studies of mouse glomeruli 70 days after injection of anti-THSD7A antibody-containing (left) or control serum (middle). Some subepithelial electron-dense deposits with areas of podocyte foot process effacement are seen on the left.
Immunohistochemical staining for human IgG (huIgG) in a mouse 70 days after receiving control serum does not depict deposition of huIgG (right).

**Supplemental Figure 6**



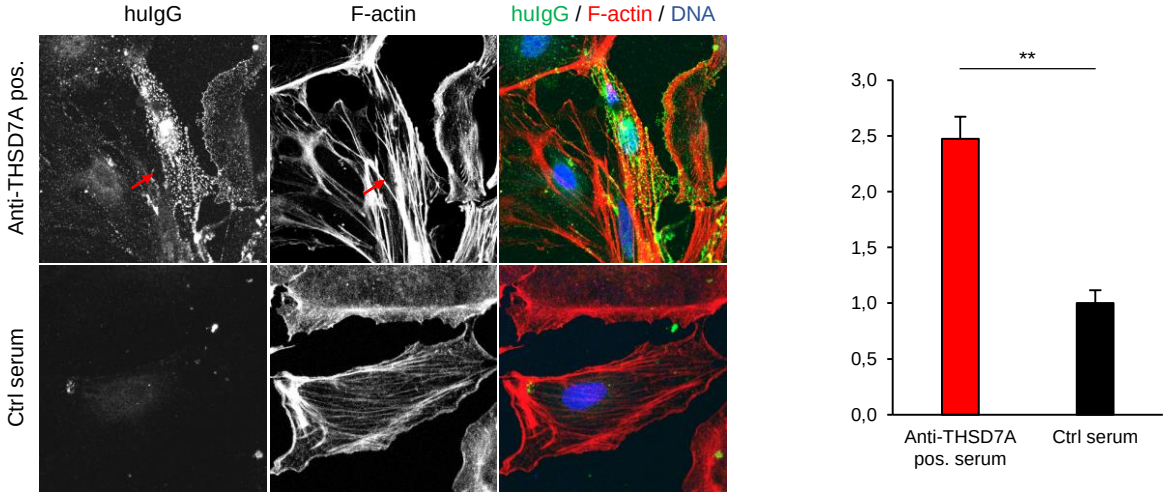

Immunofluorescent staining for DNA (blue) and human IgG (huIgG), mouse IgG (mIgG), C3, and C5b-9 in mice three days after injection of either anti-THSD7A antibody-containing or control serum.

## Supplemental Figure 7



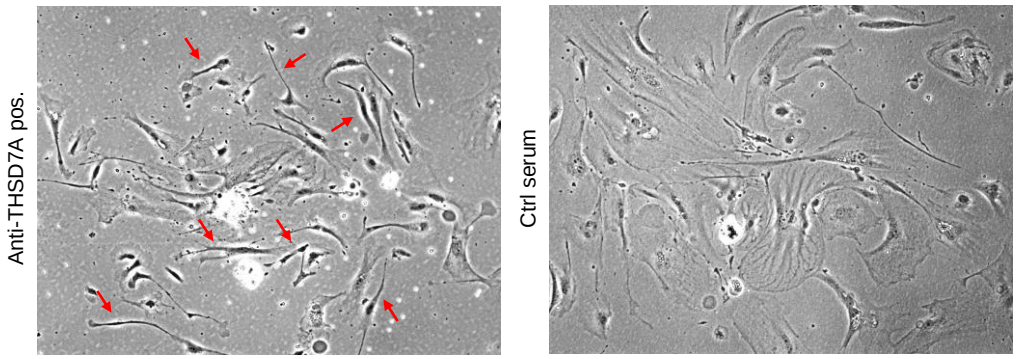

Immunofluorescent staining for human IgG (huIgG) and α-actinin-4 in mouse glomerular epithelial cells (GECs) following a 40-minute exposure to affinity-purified IgG from a healthy blood donor.

## Supplemental Figure 8



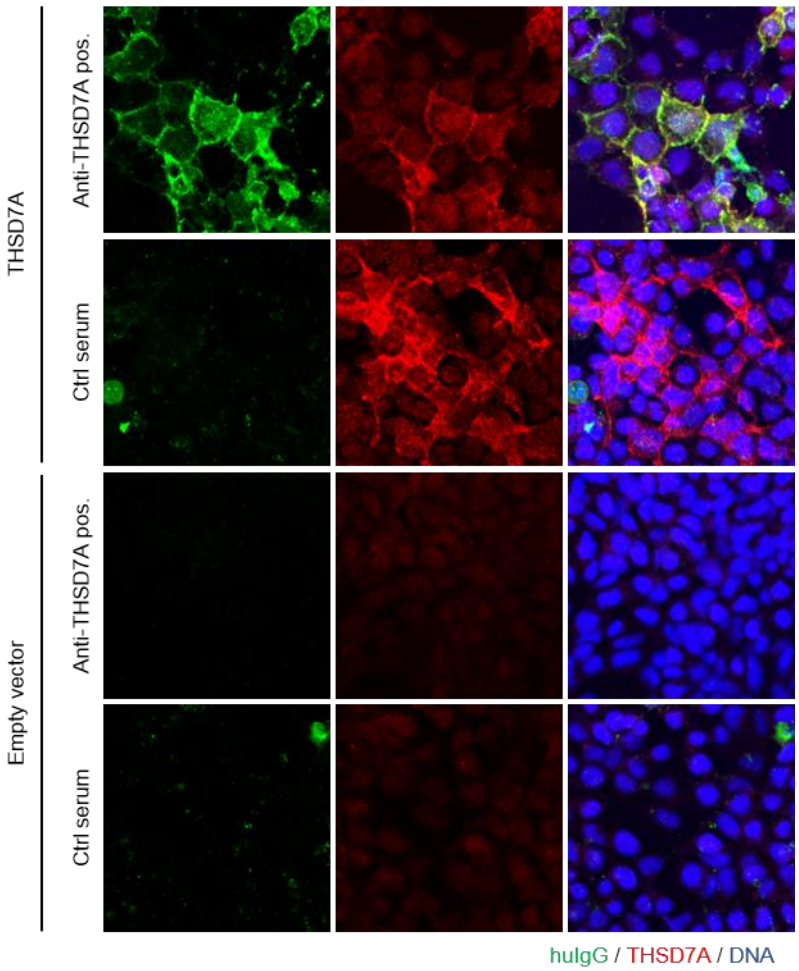

(**A**) Immunofluorescent staining for human IgG (huIgG) and filamentous (F)-actin (phalloidin) in mouse glomerular epithelial cells (GECs) following a 20-minute exposure to anti-THSD7A antibody-containing serum or control serum. (**B**) Quantification of stress fiber formation after treatment of GECs with anti-THSD7A antibody-containing serum or serum from a healthy individual. A total of thirty images from three independent experiments were analyzed. Data indicate F-actin optical density of individually circled cells normalized to the control condition (Ctrl serum). Error bars represent s.e.m. (** $P < 0.01$; two-tailed non-parametric Mann-Whitney *U* test).

**Supplemental Figure 9**



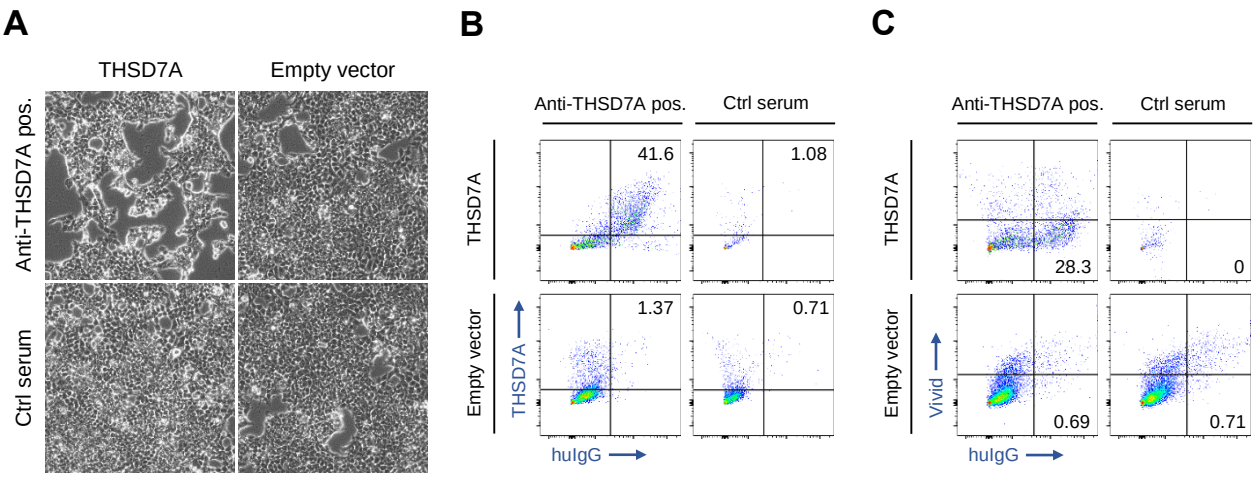

Representative phase-contrast micrographs of mouse glomerular epithelial cells (GECs) following a 40-minute exposure to 2% anti-THSD7A antibody-containing or control serum. Arrows depict elongated GECs with contracted cytoplasm, magnification 100-fold. Experiments were performed three independent times, each time with anti-THSD7A antibody-containing serum from two different patients.

**Supplemental Figure 10**



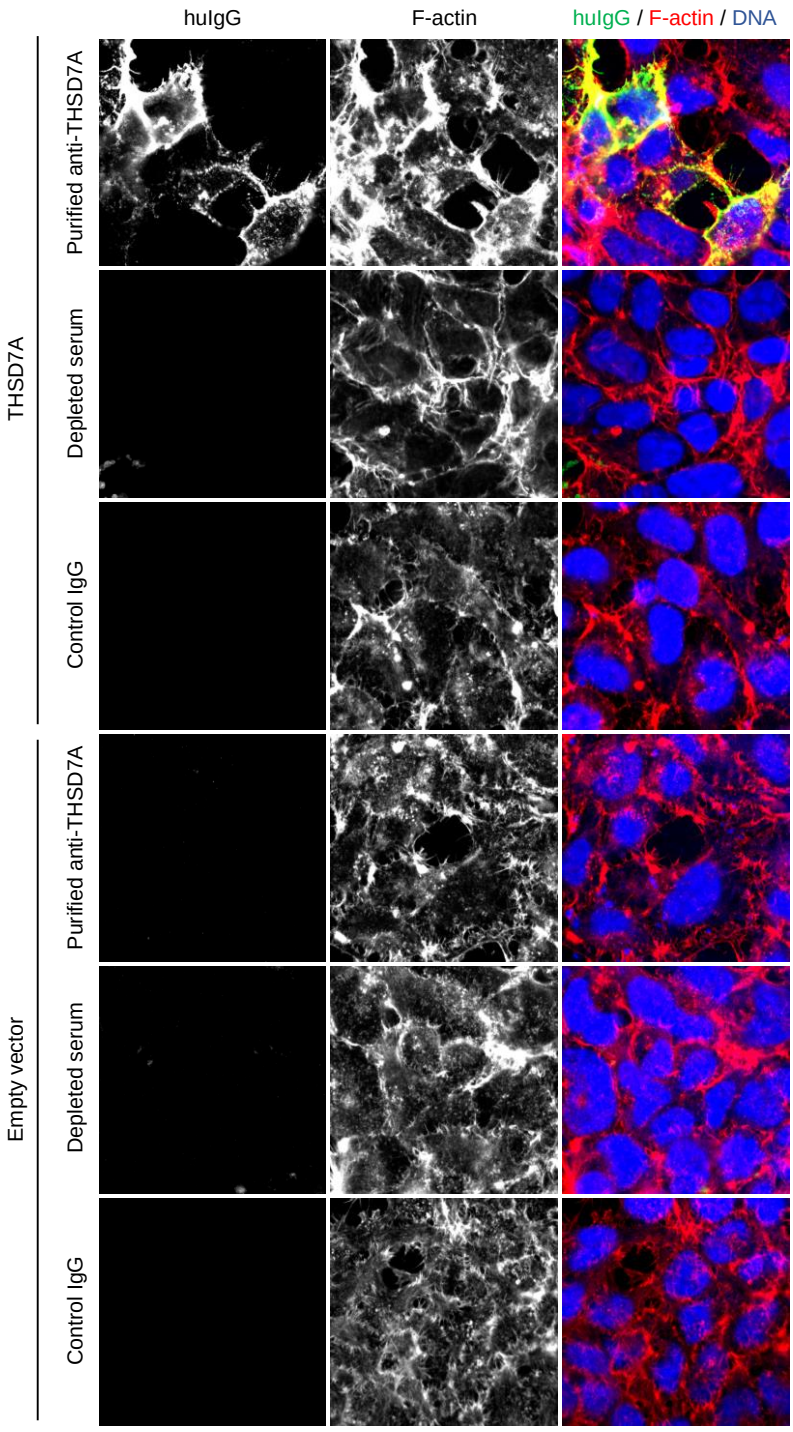

Immunofluorescent staining for huIgG and THSD7A in empty vector- or THSD7A-transfected HEK293 cells 30 minutes after treatment with either anti-THSD7A antibody-containing or control serum. Membrane-associated huIgG was exclusively found in THSD7A-transfected cells that were exposed to anti-THSD7A antibody-containing serum, suggesting specific binding of anti-THSD7A antibodies to transiently expressed THSD7A.

**Supplemental Figure 11**




(**A**) Phase-contrast micrographs of HEK293 cells transiently transfected with an empty vector or with the same vector containing THSD7A cDNA 60 minutes after treatment with either anti-THSD7A antibody-containing or control serum, magnification 100-fold. (**B**) FACS analysis of THSD7A expression and human IgG (huIgG) binding in detached HEK293 cells following transient transfection with THSD7A or the empty vector and a 60-minute incubation with either anti-THSD7A antibody-containing or normal control serum. Representative plots from three independent experiments with one anti-THSD7A antibody-containing serum are shown. (**C**) FACS analysis of live/dead cells using Vivid stain and huIgG binding in detached HEK293 cells following transient transfection with THSD7A or the empty vector and a 60-minute incubation with either anti-THSD7A antibody-containing or normal control serum. Representative data from three independent experiments with one anti-THSD7A antibody-containing serum and one control serum are shown.

**Supplemental Figure 12**




Immunofluorescent staining for human IgG (huIgG) and filamentous (F)-actin (phalloidin) in empty vector- and THSD7A-transfected HEK293 cells after a 30-minute exposure to affinity-purified anti-THSD7A antibodies, the serum depleted of anti-THSD7A antibodies, or IgG purified from a healthy donor.