### Table S1. Primary antibodies

| Antibodies     | Source       | Species | Type | Dilution | Immunogen                  | Note                                                                 |
|----------------|--------------|---------|------|----------|----------------------------|----------------------------------------------------------------------|
| ZIP1           | Home made    | Sheep   | pAb  | 1:100    | N-terminal sequence        | Specificity confirmed by immunoblots and antigen/antibody competition (Michalczyk & Ackland, 2013) |
| ZIP1           | Santa Cruz   | Goat    | pAb  | 1:50     | Cytoplasmic sequence       | Affinity purified                                                     |
| ZIP2           | Abcam        | Rabbit  | pAb  | 1:50     | Intracellular sequence     | Immunoblot shown by the manufacturer                                 |
| ZIP2           | Novus        | Rabbit  | pAb  | 1:20     | Intracellular sequence     | Immunoblot shown by the manufacturer                                 |
| ZIP6           | Abcam        | Rabbit  | mAb  | 1:25     | Immunogen undisclosed      | Immunoblot shown by the manufacturer                                 |
| ZIP8           | Sigma-Aldrich| Rabbit  | pAb  | 1:50     | Epitope undisclosed        | Affinity purified, immunoblot shown by the manufacturer              |
| ZIP9           | Abcam        | Rabbit  | pAb  | 1:30     | Internal sequence          | Immunogen affinity purified                                            |
| ZIP10          | Abcam        | Rabbit  | pAb  | 1:100    | N-terminal sequence        | Immunogen affinity purified                                            |
| ZIP12          | Abcam        | Rabbit  | pAb  | 1:50     | N-terminal sequence        | Immunoblot published Tran et al 2021                                 |
| ZIP14          | Abcam        | Rabbit  | pAb  | 1:50     | Internal sequence          | Immunogen affinity purified                                            |
| MT3            | Sigma-Aldrich| Rabbit  | pAb  | 1:50     | Immunogen undisclosed      | Affinity purified, RNAseq confirmation on tissue sections             |
| MT1 Clone UC1MT| Abcam        | Mouse   | mAb  | 1:100    | Immunogen was a full length protein | Immunoblot shown by the manufacturer, 50 plus references             |
| MT1/2 Clone E9 | Dako         | Mouse   | mAb IgG1 | 1:40 | Immunogen undisclosed      | Immunoblot shown by the manufacturer                                 |
| ET-1           | Santa Cruz   | Goat    | pAb  | 1:50     | Internal sequence          | Immunoblot shown by the manufacturer                                 |
| eNOS Clone 3/eNOS| BD           | Mouse   | mAb IgG1 | 1:50 | Aa2025-1203 sequence       | Immunoblot shown by the manufacturer                                 |
| p38 MAPK       | Cell Signalling| Rabbit | pAb  | 1:50     | Peptide sequence undisclosed| Immunogen affinity purified Immunoblots published Harper et al 2019    |
| p38 MAPK, phosphorylation | Cell Signalling| Rabbit | pAb  | 1:50     | Phosphopeptide including Thr180/Tyr182 | Immunogen affinity purified Immunoblots published Harper et al 2019 |
| HIF-1α Clone 54/HIF-1α| BD           | Mouse   | mAb IgG1 | 1:20 | Aa610-727 | Knocked out validated specificity                                    |
| α-SMA Clone 1A4| Dako         | Mouse   | mAb IgG2a | 1:200 | N-terminal synthetic decapeptide | Immunoblots published, 40 plus references                              |
## Table S2. List of patients

| ID # | Gender | Age (yrs) | BMI | Vitamin D | VHBP | Serum 25 OH vitamin D | Red meat | Sea/shellfish | Smoker | Alcohol | Questionnaire | Patient History |
|------|--------|-----------|-----|-----------|------|-----------------------|----------|---------------|--------|---------|---------------|-----------------|
| 1    | Male   | 62        | 21.9 | ✓         | ✓    | ✓                    | ✓        | ✓             | -      | -       | -             | Asthma          |
| 2    | Male   | 29        | 25.6 | ✓         | ✓    | -                    | ✓        | ✓             | ✓      | ✓       | ✓             | COPD, Asthma, Obstructive sleep apnoea, Chronic depression, Diverticular disease. Deep venous thrombosis of lower extremity, Diabetes mellitus type 2, Reflux, Atrial fibrillation. |
| 3    | Female | 78        | 34.1 | ✓         | ✓    | -                    | ✓        | ✓             | -      | -       | -             | N.History       |
| 4    | Male   | 49        | 27.7 | ✓         | ✓    | -                    | ✓        | ✓             | -      | -       | -             | N.History       |
| 5    | Female | 65        | 29.7 | ✓         | ✓    | -                    | ✓        | ✓             | -      | -       | -             | Depressive disorder, Schizophrenic, Bilateral breast surgery |
| 6    | Male   | 75        | 32.9 | ✓         | ✓    | -                    | ✓        | ✓             | -      | -       | -             | N.History       |
| 7    | Male   | 64        | 25.2 | ✓         | ✓    | -                    | ✓        | ✓             | -      | -       | -             | N.History       |
| 8    | Male   | 40        | 37.9 | ✓         | ✓    | -                    | ✓        | ✓             | -      | -       | -             | Diabetes, GORD |
| 9    | Female | 67        | 45.3 | ✓         | ✓    | -                    | ✓        | ✓             | -      | -       | -             | GORD, Asthma, Morbid obesity, Diabetes mellitus type 2, Hypertension, Rheumatoid arthritis, Obstructive sleep apnoea syndrome - good compliance w OAP. |
| 10   | Male   | 75        | 25.3 | ✓         | ✓    | -                    | ✓        | ✓             | -      | -       | -             | GORD, Asthma, Morbid obesity, Diabetes mellitus type 2, Hypertension, Rheumatoid arthritis, Obstructive sleep apnoea syndrome - good compliance w OAP. |
| 11   | Male   | 91        | 23.9 | -         | ✓    | -                    | ✓        | ✓             | -      | -       | -             | Hypertension, amputee |
| 12   | Female | 39        | 25.3 | -         | ✓    | -                    | ✓        | ✓             | -      | -       | -             | Gastroesophageal reflux disease. Hypothyroidism due to Hashimoto's thyroiditis. Anxiety. Prolactina. Ex-smoker |
| 13   | Male   | 36        | 35.3 | -         | ✓    | -                    | ✓        | ✓             | -      | -       | -             | Gout            |
| 14   | Male   | 47        | 52.7 | -         | ✓    | -                    | ✓        | ✓             | -      | -       | -             | Carcinoma, Chronic depression, Asthma, Lymphoedema, Diabetes mellitus type 2. Sleep apnoea. Ex-smoker |
Figure S1. Immunolocalization of p38 MAPK (total, left) and its phosphorylated form (right) in serial sections of human subcutaneous microvessels. Red, immunofluorescence in AF594; blue, DAPI. Scale bar is in micrometers and applied for both images.
Figure S2. Representative confocal images of conjugate alone negative controls, employed for correction of quantitative measurement of MFI. Increased nonspecific fluorescence was recorded in large bundles of collagen fibres (arrowheads), the lumen and endothelial surface (short arrow). Microvessels recognizable in the DAPI channel are indicated with asterisks. Other channels are AF488 (green), AF594 (red), AF647 (far red, pseudocolored in white). Scale bar of 40 micrometers in (a) is applied for the whole panel.