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**Table SI.** List of all antibodies used for immunohistochemistry including technical data. Abbreviation: n.a. = not available

Target	Primary Antibody	Dilution	Company	Catalogue Number
Fetuin A	Polyclonal, Goat	1:50	R&D Systems	AF1184
TNC	Monoclonal Mouse	1:50	Santa Cruz	Sc-59883
Gla-MGP	Monoclonal, Mouse	1:400	Vita K	n.a.
Glu-MGP	Monoclonal, Mouse	1:200	Vita K	n.a.
FOS-MGP	Monoclonal, Mouse	1:200	Vita K	n.a.
3-15 MPG	Monoclonal, Mouse	1:200	Vita K	n.a.
Osteoprotegerin	Polyclonal, Goat	1:100	Santa Cruz	Sc-8468
Osteocalcin	Polyclonal, Rabbit	1:100	Santa Cruz	Sc-30044
Osteopontin	Polyclonal, Mouse	1:400	Millipore	AB10910
BMP-2	Monoclonal, Mouse	1:50	Santa Cruz	Sc-73743
BMP-4	Polyclonal, Goat	1:100	Santa Cruz	Sc-6896
BMP-7	Monoclonal, Mouse	1:50	R&D Systems	MAB3541
Col2A1	Monoclonal Mouse	1:50	Santa Cruz	Sc-59958
IHH	Polyclonal, Goat	1:200	Santa Cruz	Sc-1196
Runx2	Monoclonal, Mouse	1:100	Santa Cruz	Sc-101145
Sox-9	Polyclonal, Rabbit	1:50	Santa Cruz	Sc-20095
Beta-Catenin	Monoclonal, Mouse	1:200	Dako	M3529
Anti-Goat	Polyclonal, Rabbit	1:400	Dako	E0466

**Table SII.** Standardized documentation form for staining intensity in all regions of interest

Marker	0	1	2	3	Error
Calcification					
Lumen					
Endothelium					
Intima					
Media					
Adventitia					
Interstitium					
Macrophages					
Adipose tissue					
Connective tissue					

0 = Negative

1 = low staining intensity

2 = Moderate staining intensity

3 = High staining intensity

**Table SIII.** Mean staining intensities ( $\pm$  SD) for each marker between the calciphylaxis and control group. Statistical significance using a Mann-Whitney U test is shown in the right column

Marker	Calciphylaxis group (n=18)	Control Group (n=22)	Statistical Analysis (p-value)
Fetuin A	0.84 ( $\pm$ 0.26)	0.60 ( $\pm$ 0.31)	0.09
Gla-MGP	1.31 ( $\pm$ 0.24)	0.36 ( $\pm$ 0.17)	< 0.01
Glu- MGP	1.02 ( $\pm$ 0.31)	0.33 ( $\pm$ 0.27)	0.06
FOS- MGP	0.56 ( $\pm$ 0.47)	0.10 ( $\pm$ 0.10)	0.10
OC	1.12 ( $\pm$ 0.40)	0.57 ( $\pm$ 0.27)	0.11
OPG	0.39 ( $\pm$ 0.49)	0.12 ( $\pm$ 0.16)	0.23
IHH	0.94 ( $\pm$ 0.38)	0.07 ( $\pm$ 0.10)	< 0.05
BMP-7	2.13 ( $\pm$ 0.53)	0.78 ( $\pm$ 0.18)	< 0.01
3-15- MGP	0.74 ( $\pm$ 0.35)	0.32 ( $\pm$ 0.13)	0.13

**Table SIV.** Mean staining intensity  $\pm$  SD for each marker and region of interest in the calciphylaxis group

ROI	Cacliphylaxis group (N = 18)							
	FetA	Gla-MGP	Glu-MGP	OC	OPG	IHH	BMP-7	3-15 MGP
Calcification	2.44 ( $\pm$ 1.21)	2.88 ( $\pm$ 0.33)	2.63 ( $\pm$ 0.72)	2.63 ( $\pm$ 1.02)	0,35 ( $\pm$ 0,30)	2.11 ( $\pm$ 0.93)	2.00 ( $\pm$ 1.46)	2.53 ( $\pm$ 0.83)
Lumen	1.56 ( $\pm$ 0.92)	0.89 ( $\pm$ 0.47)	0.22 ( $\pm$ 0.55)	2.44 ( $\pm$ 1.21)	0.00 ( $\pm$ 0.00)	0.44 ( $\pm$ 0.89)	0.53 ( $\pm$ 1.07)	0.53 ( $\pm$ 0.51)
Endothelium	1.00 ( $\pm$ 0.69)	1.72 ( $\pm$ 0.46)	1.06 ( $\pm$ 0.54)	2.75 ( $\pm$ 0.77)	0,24 ( $\pm$ 0,75)	0.25 ( $\pm$ 0.45)	2.87 ( $\pm$ 0.35)	0.94 ( $\pm$ 0.66)
Intima	0.61 ( $\pm$ 0.50)	0.89 ( $\pm$ 0.68)	0.89 ( $\pm$ 0.68)	0.00 ( $\pm$ 0.00)	0.00 ( $\pm$ 0.00)	0.25 ( $\pm$ 0.58)	2.00 ( $\pm$ 1.07)	0.47 ( $\pm$ 0.62)
Media	0.17 ( $\pm$ 0.38)	1.39 ( $\pm$ 0.70)	0.94 ( $\pm$ 0.73)	0.00 ( $\pm$ 0.00)	0.00 ( $\pm$ 0.00)	0.38 ( $\pm$ 0.62)	1.93 ( $\pm$ 1.03)	0.41 ( $\pm$ 0.62)
Adventitia	0.11 ( $\pm$ 0.47)	1.17 ( $\pm$ 0.71)	0.78 ( $\pm$ 0.65)	0.00 ( $\pm$ 0.00)	0.00 ( $\pm$ 0.00)	0.38 ( $\pm$ 0.62)	2.00 ( $\pm$ 1.07)	0.18 ( $\pm$ 0.39)
Interstitium	0.72 ( $\pm$ 0.75)	0.67 ( $\pm$ 0.84)	0.35 ( $\pm$ 0.79)	1.31 ( $\pm$ 1.14)	0,29 ( $\pm$ 0,85)	1.81 ( $\pm$ 0.54)	2.82 ( $\pm$ 0.39)	0.65 ( $\pm$ 0.79)
Macrophage	1.00 ( $\pm$ 1.33)	1.89 ( $\pm$ 1.23)	1.94 ( $\pm$ 0.80)	0.63 ( $\pm$ 0.89)	0,82 ( $\pm$ 1,13)	0.75 ( $\pm$ 1.06)	2.65 ( $\pm$ 1.00)	0.41 ( $\pm$ 0.71)
Adipose tissue	0.94 ( $\pm$ 0.54)	0.94 ( $\pm$ 0.24)	0.78 ( $\pm$ 0.55)	0.75 ( $\pm$ 1.00)	0,71 ( $\pm$ 1,16)	1.69 ( $\pm$ 0.79)	2.75 ( $\pm$ 0.45)	0.82 ( $\pm$ 0.39)
Connective tissue	0.76 ( $\pm$ 0.56)	0.94 ( $\pm$ 0.24)	0.72 ( $\pm$ 0.46)	1.31 ( $\pm$ 1.14)	0,35 ( $\pm$ 0,86)	1.81 ( $\pm$ 0.54)	2.76 ( $\pm$ 0.44)	0.81 ( $\pm$ 0.40)

**Table SV.** Mean staining intensity  $\pm$  SD for each marker and region of interest in the control group.

ROI	Control group (N = 22)							
	FetA	Gla-MGP	Glu-MGP	OC	OPG	IHH	BMP-7	3-15 MGP
Calcification	0.09 ( $\pm$ 0.43)	0.14 ( $\pm$ 0.64)	0.09 ( $\pm$ 0.43)	0.00 ( $\pm$ 0.00)	0.00 ( $\pm$ 0.00)	0.00 ( $\pm$ 0.00)	0.00 ( $\pm$ 0.00)	0.10 ( $\pm$ 0.44)
Lumen	1.38 ( $\pm$ 0.86)	0.05 ( $\pm$ 0.21)	0.09 ( $\pm$ 0.43)	2.00 ( $\pm$ 1.27)	0.18 ( $\pm$ 0.39)	0.05 ( $\pm$ 0.21)	0.07 ( $\pm$ 0.26)	0.10 ( $\pm$ 0.33)
Endothelium	1.10 ( $\pm$ 0.72)	0.64 ( $\pm$ 0.66)	0.50 ( $\pm$ 0.67)	2.14 ( $\pm$ 1.08)	0.23 ( $\pm$ 0.43)	0.00 ( $\pm$ 0.00)	1.20 ( $\pm$ 0.41)	0.19 ( $\pm$ 0.40)
Intima	0.85 ( $\pm$ 0.59)	0.91 ( $\pm$ 0.43)	0.86 ( $\pm$ 0.56)	0.27 ( $\pm$ 0.46)	0.05 ( $\pm$ 0.21)	0.00 ( $\pm$ 0.00)	0.93 ( $\pm$ 0.26)	0.48 ( $\pm$ 0.51)
Media	0.25 ( $\pm$ 0.44)	0.77 ( $\pm$ 0.43)	0.36 ( $\pm$ 0.49)	0.00 ( $\pm$ 0.00)	0.05 ( $\pm$ 0.21)	0.00 ( $\pm$ 0.00)	1.00 ( $\pm$ 0.00)	0.67 ( $\pm$ 0.48)
Adventitia	0.40 ( $\pm$ 0.68)	0.45 ( $\pm$ 0.51)	0.05 ( $\pm$ 0.21)	0.05 ( $\pm$ 0.21)	0.05 ( $\pm$ 0.21)	0.00 ( $\pm$ 0.00)	1.07 ( $\pm$ 0.26)	0.24 ( $\pm$ 0.44)
Interstitialium	0.50 ( $\pm$ 0.67)	0.09 ( $\pm$ 0.43)	0.09 ( $\pm$ 0.29)	0.45 ( $\pm$ 0.74)	0.09 ( $\pm$ 0.29)	0.27 ( $\pm$ 0.46)	1.47 ( $\pm$ 0.52)	0.19 ( $\pm$ 0.40)
Macrophage	0.09 ( $\pm$ 0.29)	0.00 ( $\pm$ 0.00)	0.45 ( $\pm$ 0.67)	0.18 ( $\pm$ 0.50)	0.14 ( $\pm$ 0.64)	0.00 ( $\pm$ 0.00)	0.13 ( $\pm$ 0.35)	0.19 ( $\pm$ 0.51)
Adipose tissue	1.10 ( $\pm$ 0.30)	0.68 ( $\pm$ 0.48)	0.55 ( $\pm$ 0.60)	0.29 ( $\pm$ 0.56)	0.05 ( $\pm$ 0.22)	0.14 ( $\pm$ 0.35)	1.20 ( $\pm$ 0.41)	0.57 ( $\pm$ 0.51)
Connective tissue	0.90 ( $\pm$ 0.54)	0.10 ( $\pm$ 0.30)	0.14 ( $\pm$ 0.35)	0.59 ( $\pm$ 0.91)	0.14 ( $\pm$ 0.35)	0.27 ( $\pm$ 0.46)	1.53 ( $\pm$ 0.52)	0.43 ( $\pm$ 0.51)

**Table SVI.** The mean staining intensity  $\pm$  SD for each marker between all subgroups is listed below

Marker	OAK (n = 9)	Non-OAK (n = 9)	DM (n = 9)	Non-DM (n = 9)	CKD 1-3 (n = 4)	CKD 4-5 (n = 14)	CKD-HD (n = 10)	CKD -nHD (n = 8)	pAVK (n = 8)	Non-pAVK (n = 10)
FetA	0.96 ( $\pm$ 0.29)	0.86 ( $\pm$ 0.29)	0.94 ( $\pm$ 0.32)	0.90 ( $\pm$ 0.27)	0.91 ( $\pm$ 0.42)	0.92 ( $\pm$ 0.26)	0.86 ( $\pm$ 0.27)	0.98 ( $\pm$ 0.31)	0.72 ( $\pm$ 0.33)	0.77 ( $\pm$ 0.23)
Gla-MGP	1.34 ( $\pm$ 0.17)	1.34 ( $\pm$ 0.23)	1.24 ( $\pm$ 0.21)	1.28 ( $\pm$ 0.11)	1.31 ( $\pm$ 0.16)	1.35 ( $\pm$ 0.20)	1.3 ( $\pm$ 0.22)	1.38 ( $\pm$ 0.15)	1.13 ( $\pm$ 0.17)	1.21 ( $\pm$ 0.24)
Glu-MGP	1.15 ( $\pm$ 0.19)	0.90 ( $\pm$ 0.30)	1.04 ( $\pm$ 0.31)	1.05 ( $\pm$ 0.25)	1.13 ( $\pm$ 0.09)	1.0 ( $\pm$ 0.30)	0.94 ( $\pm$ 0.31)	1.13 ( $\pm$ 0.20)	0.90 ( $\pm$ 0.23)	0.83 ( $\pm$ 0.36)
FOS-MGP	0.56 ( $\pm$ 0.35)	0.53 ( $\pm$ 0.46)	0.57 ( $\pm$ 0.37)	0.52 ( $\pm$ 0.42)	0.56 ( $\pm$ 0.43)	0.54 ( $\pm$ 0.39)	0.4 ( $\pm$ 0.31)	0.69 ( $\pm$ 0.42)	0.54 ( $\pm$ 0.38)	0.57 ( $\pm$ 0.40)
OPG	0.15 ( $\pm$ 0.14)	0.39 ( $\pm$ 0.58)	0.33 ( $\pm$ 0.66)	0.24 ( $\pm$ 0.22)	0.1 ( $\pm$ 0.14)	0.33 ( $\pm$ 0.49)	0.39 ( $\pm$ 0.58)	0.15 ( $\pm$ 0.14)	0.10 ( $\pm$ 0.15)	0.42 ( $\pm$ 0.52)
OC	1.26 ( $\pm$ 0.43)	1.04 ( $\pm$ 0.38)	1.01 ( $\pm$ 0.31)	1.31 ( $\pm$ 0.47)	1.2 ( $\pm$ 0.1)	1.17 ( $\pm$ 0.47)	1.13 ( $\pm$ 0.39)	1.24 ( $\pm$ 0.49)	1.16 ( $\pm$ 0.35)	0.91 ( $\pm$ 0.51)
IHH	0.96 ( $\pm$ 0.51)	0.93 ( $\pm$ 0.21)	0.99 ( $\pm$ 0.37)	0.90 ( $\pm$ 0.36)	0.99 ( $\pm$ 0.48)	0.92 ( $\pm$ 0.34)	0.90 ( $\pm$ 0.39)	0.99 ( $\pm$ 0.32)	0.90 ( $\pm$ 0.35)	0.83 ( $\pm$ 0.37)
BMP-7	2.08 ( $\pm$ 0.47)	2.29 ( $\pm$ 0.41)	2.26 ( $\pm$ 0.40)	2.24 ( $\pm$ 0.35)	1.87 ( $\pm$ 0.12)	2.33 ( $\pm$ 0.34)	2.42 ( $\pm$ 0.34)	2.02 ( $\pm$ 0.24)	2.21 ( $\pm$ 0.45)	2.29 ( $\pm$ 0.40)
3-15 MGP	0.58 ( $\pm$ 0.17)	0.86 ( $\pm$ 0.27)	0.79 ( $\pm$ 0.27)	0.72 ( $\pm$ 0.29)	0.61 ( $\pm$ 0.13)	0.79 ( $\pm$ 0.30)	0.72 ( $\pm$ 0.31)	0.78 ( $\pm$ 0.25)	0.48 ( $\pm$ 0.20)	0.67 ( $\pm$ 0.28)

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