In vivo and *ex vivo* assessment of microvasculature function in renal transplant recipients from a living donor

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Conclusions

- Inhibition of nitric oxide synthase and cyclooxygenase decreased endothelium dependent relaxation in control but not uremic arteries.
- Norepinephrine-induced vasoconstriction was blunted in uremic arteries compared to control arteries.
- Bradykinin-induced relaxation *(ex vivo)* of resistance arteries did not correlate with *in vivo* RHI.

Aims

- To compare endothelial function between donors and CKD patients (recipients) *ex vivo* and *in vivo*
- To relate Reactive Hyperemia Index (RHI), reflecting endothelial function *in vivo*, with endothelium-dependent dilatation of small resistance vessels *ex vivo* in both donors and CKD patients

Methods

- Subjects were living donors (n=31) and recipients (n=32) undergoing renal transplantation
- Resistance-sized arteries (Ø≈230 µm) from subcutaneous fat biopsies were isolated to assess *ex vivo* endothelial and smooth muscle function using **wire myography**
- *In vivo* **RHI** was assessed using the EndoPAT

Results

Recipient and donor groups were of similar age (46±3 vs 50±2 years). In the *ex vivo* isometric force measurements, arteries from recipients demonstrated similar bradykinin-induced (BK) relaxation compared to arteries from donors. Nitric oxide synthase and cyclooxygenase inhibition decreased BK relaxation in donors but not recipients (**Fig. 1**).

Sodium nitroprusside-induced (SNP) relaxation was similar between arteries from recipients and donors (**Fig. 2A**).

Contractions obtained after stimulation with KCl and agonists phenylephrine were similar in both groups. Norepinephrine-induced (NE) contractile response was blunted in arteries from recipients compared to arteries from donors (**Fig. 2B**). Basal tension and other functional parameters did not differ (**Fig.4**).

There were no differences in the subgroups of recipients on dialysis vs. not on renal replacement therapy.

Endothelial function measured in vivo (RHI) did not differ between recipients (n=23) and donors (n=24)**.** RHI did not correlate with BK relaxation or any other parameters studied. (**Fig. 3**)

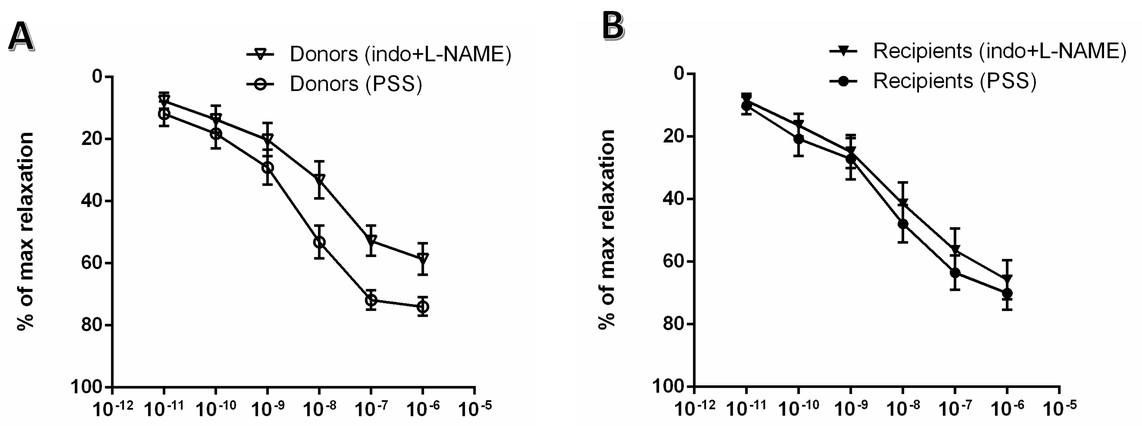

Figure 1. Endothelium dependent relaxation (BK) in PSS and after incubation with L-NAME and indomethacin in donors (A) and recipients (B).

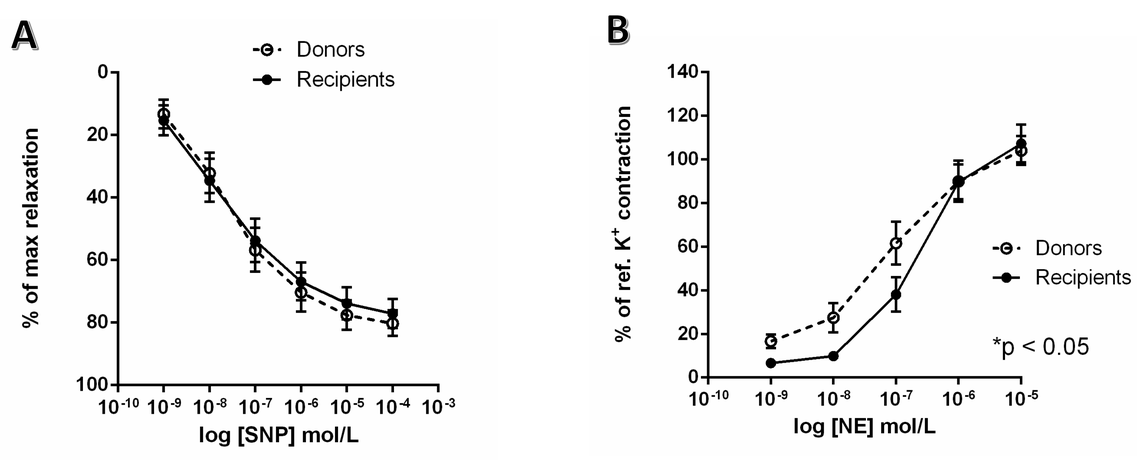

Figure 2. (A) Comparable endothelium independent relaxation in both donors and recipients (induced by sodium nitroprusside - SNP)
(B) Blunted contraction to norepinephrine in recipients compared to donors

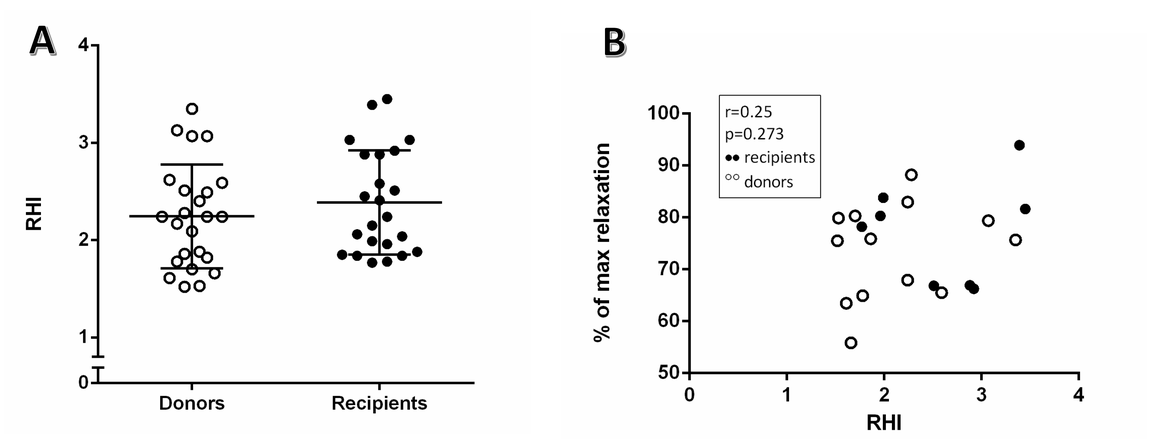

Figure 3. (A) Comparison of RHI between donors and recipients
(B) Correlation of RHI and BK relaxation

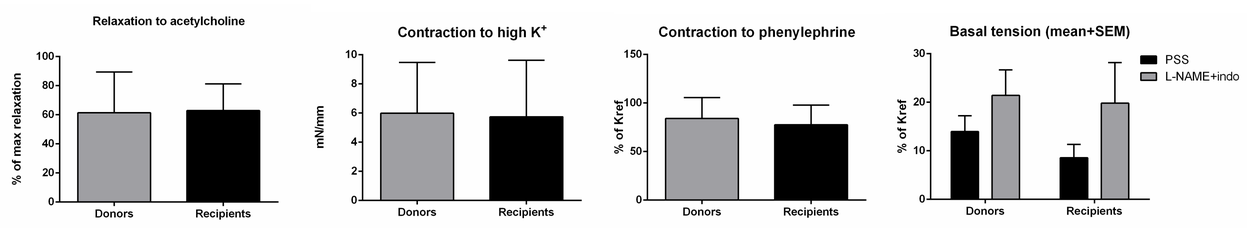

Figure 4. No differences in other functional parameters measured *in vitro*

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