SUPPLEMENTAL APPENDIX

Table of Contents:

SUPPLEMENTARY METHODS

Full Eligibility Criteria:

Inclusion criteria for patient enrollment in the study were:

- Patient willing and competent to provide approved informed consent
- Patient must be over 21 years of age.
- Patients must weigh between 45 and 100 kg.
- Patient must have End Stage Renal Disease and currently undergoing maintenance hemodialysis at least three times a week for at least 3 months prior to enrolment.
- Vascular access must be through a functioning double lumen catheter with no thrombolytic therapy or clotting of the catheter within the past 4 weeks.
- Willing to comply with the requirements of experimental treatment with the WAK for up to 24 hours.
- Expected survival of no less than 6 months.
- Consent to allow review of their medical records by the investigators, and monitors.
- Fluency in English
- Hemoglobin level ≥ 9.0 g/dL prior to WAK treatment

Exclusion criteria for the study were:

- Anticipated or scheduled for a living related donor kidney transplant in less than 2 months.
- History (within the 12 weeks prior to the study) of cardiovascular events including;
  - Unstable angina
  - Myocardial Infarction
  - Stroke
  - Clinically significant arrhythmia
- Life threatening arrhythmia within the past 30 days
- Intradialytic hypotension, deemed severe by the investigator, within the past 30 days
- Shock within the past 30 days, as defined by the investigator
- Hemodynamic instability as demonstrated by repeated episodes of hypotension or hypertension requiring intervention by dialysis personnel or representing a present hazard to the patient.
- Seizure disorder requiring active treatment for a seizure episode during the last 6 months.
- Major surgery (excluding vascular access surgery) within the past 30 days.
- Currently receiving intravenous antibiotic therapy for systemic infection.
- Clinical evidence of metastatic malignancy, receiving radiation or chemotherapy, within the past 365 days.
- Active bleeding.
- Hematological diseases such as malignancies, hemolytic anemia, and thrombocytopenia
- Vascular access catheter dysfunction, defined as inability to routinely achieve blood flow rates of at least 300 mL per minute, or requires switching ports (reversing lines), during the past 30 days.

- Current enrolment in another investigational device or drug trial.
- Subject is pregnant (e.g., positive HCG test) or is breast feeding
- Subject has any disorder (excluding illiteracy or visual impairment) that compromises the ability of the subject to give written informed consent and/or to comply with the study procedures.
- Allergy to heparin or ethylene oxide
- Hypertension deemed uncontrolled, at the discretion of the investigator, within the past 30 days.
- Has an implantable electronic device (e.g. pacemaker)

Table S1. Comparison of mean solute clearances (ml/min) calculated using two alternate equations, by study time point

		Hour				
Solute	**Clearance-calculation [a]**	**1**	**8**	**12**	**16**	**24**
Urea	Blood-based	20.7 ± 13.4	17.1 ± 8.9	15.9 ± 10.0	18.7 ± 9.0	10.3 ± 8.0
	Dialysate-based	13.4 ± 8.6	18.2 ± 6.9	9.1 ± 10.2	13.2 ± 3.9	12.8 ± 9.6
Creatinine	Blood-based	20.4 ± 10.8	15.6 ± 8.3	15.0 ± 8.6	16.0 ± 7.3	8.5 ± 6.3
	Dialysate-based	N/A	17.5 ± 12.4	13.4 ± 9.4	14.3 ± 8.6	13.9 ± 8.2
Phosphorus	Blood-based	22.0 ± 11.9	14.4 ± 7.2	14.8 ± 8.1	15.2 ± 6.1	6.3 ± 2.3
	Dialysate-based	16.4 ± 2.9	15.3 ± 6.9	14.6 ± 8.8	11.5 ± 3.9	8.9 ± 4.6
β2-microglobulin	Blood-based	9.0 ± 3.0	4.1 ± 3.4	N/A	4.9 ± 3.3	1.8 ± 4.4
	Dialysate-based	N/A	5.4 ± 2.2	N/A	4.0 ± 1.4	3.5 ± 1.2

[a] Blood-based clearance calculated as: $(K_{B)} = \frac{Q_B \times (C_{in} - C_{out}) \times (1 - Hct)}{C_{in}}$, where Q_B is the blood flow rate (mL/min), C_{in} is the blood concentration of solute entering the dialyzer, C_{out} is the blood concentration of solute exiting the dialyzer, and *Hct* is the blood hematocrit. Dialysate-based clearance calculated as: $(K_D) = \frac{C_{Dialysate} \times Q_D}{C_{Blood}}$, where Q_D is the dialysate flow rate (ml/min), $C_{Dialysate}$ is the dialysate solute concentration, calculated as the difference between the post- and pre-dialyzer dialysate solute measurements, and C_{Blood} is the blood concentration of solute entering the dialyzer.

Table S2. Comparison of mean pre- and post-sorbent dialysate solute concentrations, by study time point

Solute	Concentration									
	Hour 1		Hour 8		Hour 12		Hour 16		Hour 24	
	Pre[a]	Post[b]	Pre[a]	Post[b]	Pre[a]	Post[b]	Pre[a]	Post[b]	Pre[a]	Post[b]
Urea (mg/dL)	8.0 ± 5.3	0.7 ± 0.6	6.9 ± 2.5	0.3 ± 0.5	4.1 ± 4.2	0.5 ± 1.0	5.2 ± 2.9	0	6.4 ± 5.1	0
Creatinine (mg/dL)	-	-	1.3 ± 0.5	0	1.1 ± 0.3	0	1.1 ± 0.3	0	1.2 ± 0.5	0
Phosphorus (mg/dL)	2.1 ± 0.7	0	1.8 ± 0.7	0.5 ± 0.6	1.3 ± 0.4	0	1.5 ± 0.4	0.4 ± 0.4	1.8± 0.6	0.9 ± 0.7
β2-microglobulin (mg/L)	-	-	3.4 ± 1.5	1.0 ± 0.6	2.6 ± 2.0	1.1 ± 1.0	2.7 ± 1.5	1.2 ± 0.6	2.9 ± 1.9	1.5 ± 1.1

Results shown are mean values ± the standard deviation. Values are reported if available for ≥ 2 subjects

[a] Sample drawn from the post-dialyzer, pre-sorbent dialysate port

[b] Sample drawn from the pre-dialyzer, post-sorbent dialysate port

Table S3. Summary of device-related technical issues and corrective actions during treatment phase of study[a]

		Subject Number						
Issue	**Corrective Action Taken**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Blood Flows <20ml/min	Repositioning tubing and recalibrated	>5	0	0	0	2	0	1
Dialysate Flows <20ml/min	Repositioning tubing and recalibrated	>5	5	0	0	2	0	3
Kinked tubing	Kink removed	>5	>5	0	1	1	0	0
Clotting at venous access port	Aspirated and removed clot at port	0	0	0	2	0	0	0
Main pump dysfunction	Replaced pump cartridge	0	1	0	0	0	0	0
Excessive bubbles in sorbent cartridges	Replaced sorbent cartridges	0	0	0	0	0	0	2
Decrease in main pump battery power	Batteries replaced	0	0	0	0	1	1	0
Excessive bubbles in dialysate	Removed via syringe	1	2	0	1	2	2	>5
Bubbles in venous blood circuit	Removed via syringe	1	1	1	0	0	0	0
Cracked bubble trap	Bubble trap replaced	0	0	0	0	0	1	0

[a]Values indicate number of instances issue occurred along with corresponding corrective action

Table S4. Detailed description of study adverse events

Subject Number	Adverse Event	Severity	Serious Event	Relationship to Trial	Corrective Action Taken	Outcome
1	Hand cramping	Mild	No	Related	Decrease UF Rate	Resolved
2	Leg cramping	Mild	No	Related	None	Spontaneously resolved
2	Leg cramping	Mild	No	Related	None	Spontaneously resolved
3	Malaise	Moderate	No	Not related	None	Resolved
5	Nausea	Mild	No	Not related	None	Spontaneously resolved
7	Diarrheal	Mild	No	Note related	None	Spontaneously resolved