**Supplementary material**

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Figure S1: Risk of bias assessment tool. Across trials, information is either from trials at a low risk of bias (green), or from trials at unclear risk of bias (yellow), or from trials at high risk of bias (red).

Figure S2: Flow chart for meta-analysis article selection process.

Records identified through database searching: (until 27th February 2014)
PUBMED (n=5942)

Cochrane Library (n=6835)

EMBASE (n=2955)

Additional records identified through other sources
(n =2)

Records screened
(n =15734)

Records excluded: title, abstract, not relevant, case-report, cross-sectional study, review, mechanism study

(n=15614)

Full-text articles assessed for eligibility
(n =120)

Full-text articles excluded, with reasons (n =90)

Macroalbuminuria (n=36)

Chronic kidney disease (n=43)

No data (n=7)

Lack of a comparison (n=4)

Studies included in qualitative synthesis
(n = 30)

Studies included in quantitative synthesis (meta-analysis)

n=30 (32 reports)

**Electronic search strategy (specifics as required for MEDLINE: 27.02.2014)**

Limits used: “randomized controlled trials”, “humans”, and “Adult: 19+ years“

("protein") AND ("renal" OR "kidney" OR "glomerular filtration rate" OR "creatinine" OR "urea" OR "albumin" OR "calcium")

"protein"[All Fields] AND ("renal"[All Fields] OR "kidney"[All Fields] OR "glomerular filtration"[All Fields] OR "creatinine"[All Fields] OR "urea"[All Fields] OR "albumin"[All Fields] OR "calcium"[All Fields]) AND (Randomized Controlled Trial[ptyp] AND "humans"[MeSH Terms] AND "adult"[MeSH Terms])

Figure S3. Forest plot showing pooled MD with 95% CI for serum creatinine (µmol/l) for 22 randomized controlled HP diet studies. For each HP study, the shaded square represents the point estimate of the intervention effect. The horizontal line joins the lower and upper limits of the 95% CI of these effects. The area of the shaded square reflects the relative weight of the study in the respective meta-analysis. HP, high protein; NP/LP, normal protein/low protein.

Figure S4. Forest plot showing pooled WMD with 95% CI for serum uric acid (µmol/l) for 8 randomized controlled HP diet studies. For each HP study, the shaded square represents the point estimate of the intervention effect. The horizontal line joins the lower and upper limits of the 95% CI of these effects. The area of the shaded square reflects the relative weight of the study in the respective meta-analysis. HP, high protein; NP/LP, normal protein/low protein.

 Figure S5. Forest plot showing pooled MD with 95% CI for urinary albumin/protein excretion (mg/24h) for 11 randomized controlled HP diet studies. For each HP study, the shaded square represents the point estimate of the intervention effect. The horizontal line joins the lower and upper limits of the 95% CI of these effects. The area of the shaded square reflects the relative weight of the study in the respective meta-analysis. HP, high protein; NP/LP, normal protein/low protein.



Figure S6. Forest plot showing pooled WMD with 95% CI for urinary calcium excretion (mg/24h) for 10 randomized controlled HP diet studies. For each HP study, the shaded square represents the point estimate of the intervention effect. The horizontal line joins the lower and upper limits of the 95% CI of these effects. The area of the shaded square reflects the relative weight of the study in the respective meta-analysis. HP, high protein; NP/LP, normal protein/low protein.

 Figure S7. Forest plot showing pooled MD with 95% CI for urinary pH of 7 randomized controlled HP diet trails.

For each high protein study, the shaded square represents the point estimate of the intervention effect. The horizontal line joins the lower and upper limits of the 95% CI of these effects. The area of the shaded square reflects the relative weight of the study in the respective meta-analysis. The diamond at the bottom of the graph represents the pooled MD with the 95% CI. HP, high protein; NP/LP, normal protein/low protein.



Figure S8. Funnel plot showing study precision against the MD effect estimate with 95% CIs for glomerular filtration rate. SE = Standard error.

Figure S9. Funnel plot showing study precision against the MMD effect estimate with 95% CI for serum creatinine. SE = Standard error.



Figure S10. Funnel plot showing study precision against the MD effect estimate with 95% CIs for serum urea. SE = Standard error.



Figure S11. Funnel plot showing study precision against the MD effect estimate with 95% CIs for serum uric acid. SE = Standard error.



Figure S12. Funnel plot showing study precision against the MD effect estimate with 95% CIs for urinary pH. SE = Standard error.



Figure S13. Funnel plot showing study precision against the WMD effect estimate with 95% CIs for urinary albumin. SE = Standard error Figure S18.

Figure S14. Funnel plot showing study precision against the MD effect estimate with 95% CIs for urinary calcium excretion. SE = Standard error.

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| --- | --- | --- | --- | --- | --- | --- |
| **Outcomes** | **No. of****Studies** | **Sample size** | **MD**  | **95% CI** | **p-values** | **Inconsistency I2** |
| GFR (ml/min/1.73m2) | 14 | 1324 | 4.96 | [3.38, 6.54] | <0.001 | 0% |
| Creatinine (µmol/l) | 16 | 1561 | -1.35  | [-4.22, 1.51] | 0.35 | 69% |
| Urea (mmol/l) | 9 | 762 | 1.06 | [0.76, 1.36] | <0.001 | 27% |
| Uric acid (µmol/l) | 3 | 152 | 0.19  | [-0.20, 0.57] | 0.35 | 0% |
| Urinary Albumin/protein (mg/24h) | 8 | 674 | -0.22  | [-1.73, 1.29] | 0.78 | 0% |
| Urinary calcium excretion (mg/24h) | 5 | 562 | 46.59  | [-11.26, 104.44] | 0.11 | 88% |

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| --- | --- | --- | --- | --- | --- | --- |
| **Outcomes** | **No. of****Studies** | **Sample size** | **MD**  | **95% CI** | **p-values** | **Inconsistency I2** |
| GFR (ml/min/1.73m2) | 15 | 1296 | 7.73 | [4.43, 11.04] | <0.001 | 63% |
| Creatinine (µmol/l) | 14 | 1205 | -2.64  | [-4.92, -0.35] | 0.02 | 61% |
| Urea (mmol/l) | 9 | 752 | 1.87 | [1.13, 2.61] | <0.001 | 92% |
| Uric acid (µmol/l) | 5 | 168 | 0.14 | [-0.26, 0.55] | 0.49 | 43% |
| Urinary pH | 5 | 170 | -0.46 | [-0.99, 0.08] | 0.09 | 96% |
| Urinary Albumin/protein (mg/24h) | 4 | 501 | 2.92 | [-3.23, 9.08] | 0.35 | 85% |
| Urinary calcium excretion (mg/24h) | 6 | 529 | 27.34 | [14.30, 40.38] | <0.001 | 94% |

Table S1: Sensitivity analysis for subjects without T2D: Pooled estimates of effect size (95% confidence intervals) expressed as weighted mean difference for the effects of HP vs. NP/LP diets on outcomes of renal function.

Table S2: Sensitivity analysis for obese subjects: Pooled estimates of effect size (95% confidence intervals) expressed as weighted mean difference for the effects of HP vs. NP/LP diets on outcomes of renal function.

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| --- | --- | --- | --- | --- | --- | --- |
| **Outcomes** | **No. of****Studies** | **Sample size** | **MD**  | **95% CI** | **p-values** | **Inconsistency I2** |
| GFR (ml/min/1.73m2) | 12 | 992 | 6.23  | [3.52, 8.93] | <0.001 | 0% |
| Creatinine (µmol/l) | 14 | 1236 | -1.68  | [-5.14, 1.77] | 0.34 | 67% |
| Urea (mmol/l) | 7 | 730 | 1.03  | [0.75, 1.30] | <0.00001 | 20% |
| Uric acid (µmol/l) | 3 | 151 | 0.18  | [-0.22, 0.58] | 0.37 | 0% |
| Urinary Albumin/protein (mg/24h) | 6 | 618 | -0.04 | [-1.68, 1.60] | 0.96 | 0% |
| Urinary calcium excretion (mg/24h) | 4 | 546 | 50.69  | [-10.49, 111.88] | 0.10 | 91% |

Table S3: Sensitivity analysis for long-term studies (≥12 weeks): Pooled estimates of effect size (95% confidence intervals) expressed as weighted mean difference for the effects of HP vs. NP/LP diets on outcomes of renal function.

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| --- | --- | --- | --- | --- | --- | --- |
| **Outcomes** | **No. of****Studies** | **Sample size** | **MD**  | **95% CI** | **p-values** | **Inconsistency I2** |
| GFR (ml/min/1.73m2) | 6 | 303 | 4.55 | [0.11, 8.99] | 0.04 | 0% |
| Creatinine (µmol/l) | 8 | 784 | 0.59  | [-2.31, 3.48] | 0.69 | 22% |
| Urea (mmol/l) | 3 | 71 | 1.47  | [0.07, 2.88] | 0.04 | 32% |
| Uric acid (µmol/l) | 2 | 40 | 0.22  | [-0.52, 0.96] | 0.56 | 0% |
| Urinary Albumin/protein (mg/24h) | 7 | 282 | -2.09 | [-4.51, 0.33] | 0.09 | 0% |
| Urinary calcium excretion (mg/24h) | 4 | 179 | 17.04  | [-8.33, 42.40] | 0.19 | 0% |

Table S4: Sensitivity analysis for T2D subjects: Pooled estimates of effect size (95% confidence intervals) expressed as weighted mean difference for the effects of HP vs. NP/LP diets on outcomes of renal function.

**References S1-32**

[[1-32](#_ENREF_1)]

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