

I

Dose-Response Effects of Sodium Intake on Blood Pressure

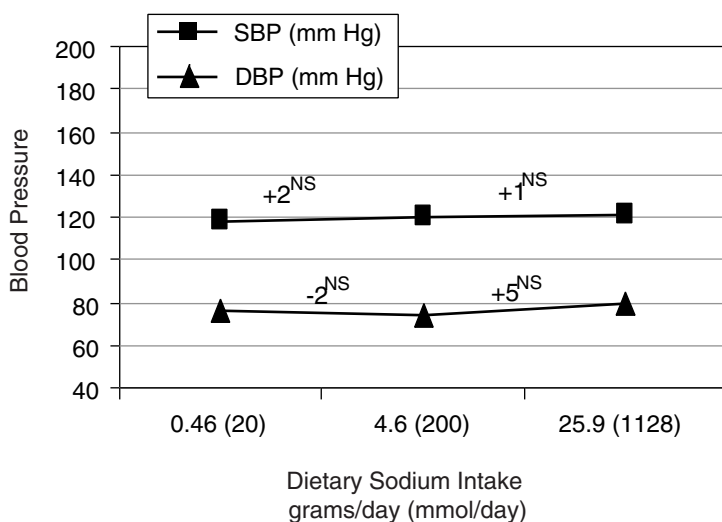


FIGURE I-1 Blood pressure (mm Hg) according to dietary sodium intake in g/d (mmol/d) among 8 normotensive men and women. Each sodium level was provided for 5 d. NS = not significantly different. Data from Roos et al. (1985).

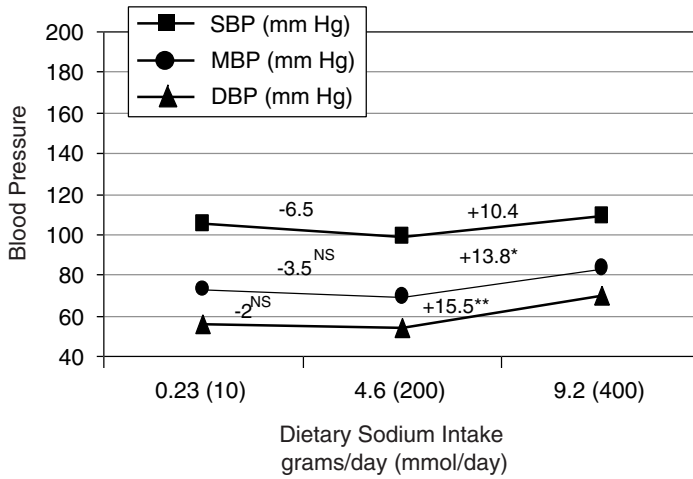


FIGURE I-2 Blood pressure (mm Hg) according to dietary sodium intake in g/d (mmol/d) among 6 normotensive subjects at risk of hypertension. Each sodium level was provided for 4 d. Systolic blood pressures were calculated from the formula mean blood pressure = $2/3$ diastolic blood pressure + $1/3$ systolic blood pressure. NS = not significantly different; * $p < 0.001$; ** $p < 0.05$. Data from Sullivan et al. (1980).

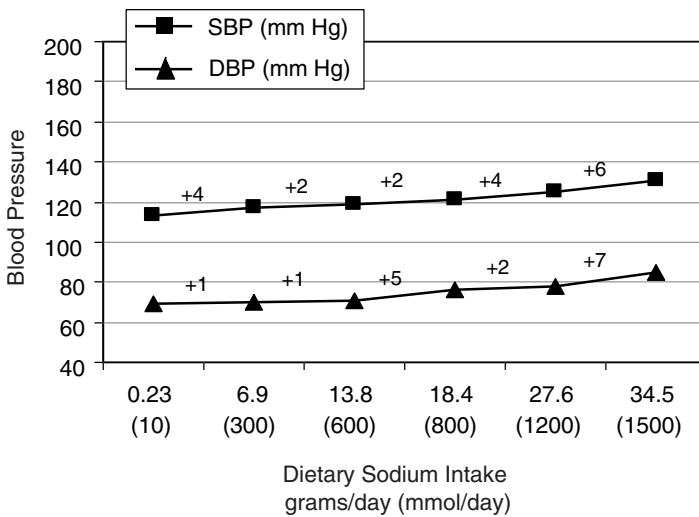


FIGURE I-3 Blood pressure (mm Hg) according to dietary sodium intake in g/d (mmol/d) among 14 normotensive men. Each sodium level was provided for 3–7 d. Significant difference between 10 and 800 mmol/d ($p < 0.05$). Data from Luft et al. (1979).

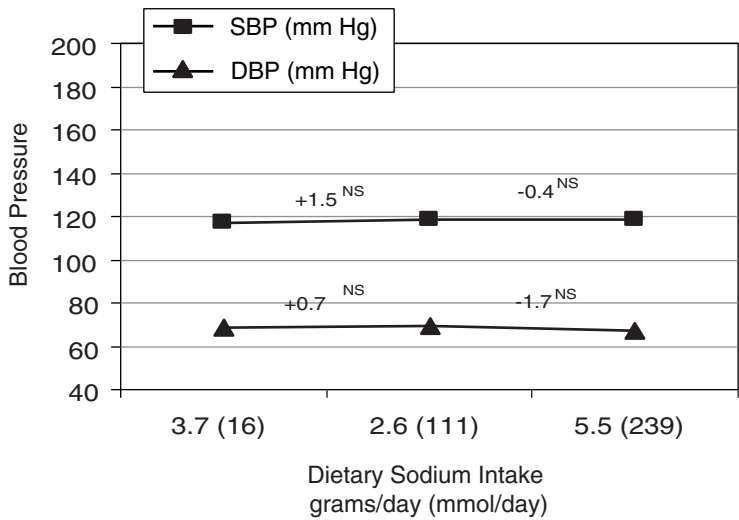


FIGURE I-4 Blood pressure (mm Hg) according to dietary sodium intake in g/d (mmol/d) among 11 normotensive men and women with a family history of hypertension. Each sodium level was provided for 9 d. NS = not significantly different. Data from Fuchs et al. (1987).

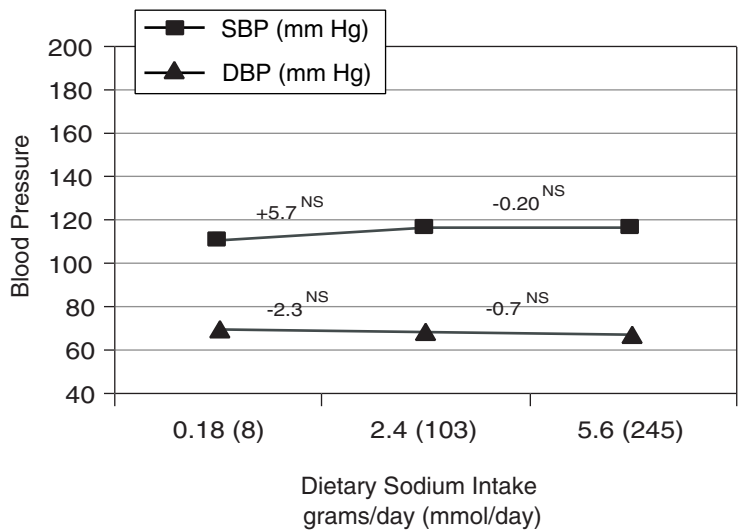


FIGURE I-5 Blood pressure (mm Hg) according to dietary sodium intake in g/d (mmol/d) among 6 normotensive men and women without family history of hypertension. Each sodium level was provided for 9 d. NS = not significantly different. Data from Fuchs et al. (1987).

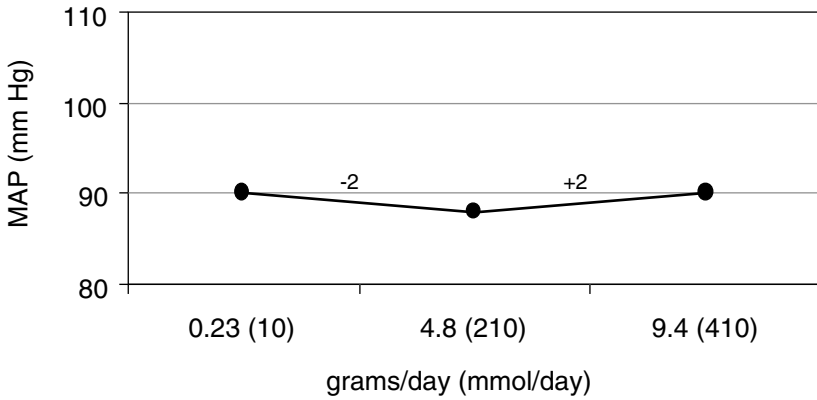


FIGURE I-6 Mean supine blood pressure (mm Hg) according to dietary sodium intake in g/d (mmol/d) among 8 normotensive men. Each sodium level was provided for 4 wk. NS = not significantly different. Data from Kirkendall et al. (1976).

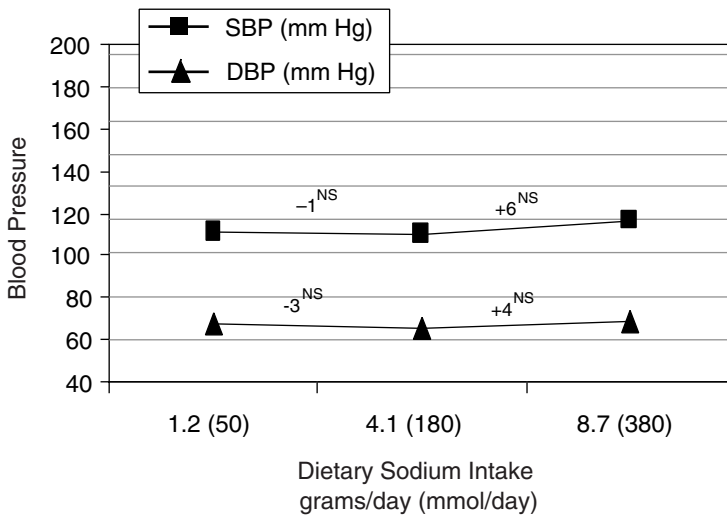


FIGURE I-7 Blood pressure (mm Hg) according to dietary sodium intake in g/d (mmol/d) among 10 normotensive men and women. Each sodium level was provided for 4 d. NS = not significantly different. Data from Bruun et al. (1990).

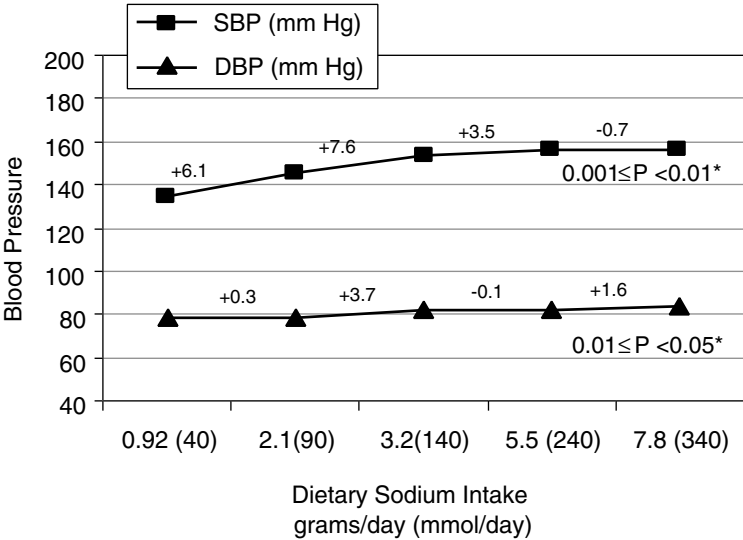


FIGURE I-8 Blood pressure (mm Hg) according to sodium intake in g/d (mmol/d) among 17 normotensive elderly subjects. Each sodium level was provided for 2 wk. *P-ANOVA simultaneously comparing the four pair-wise blood pressure differences between the lowest sodium level (baseline) and each of the four higher sodium levels. Data from Johnson et al. (2001).

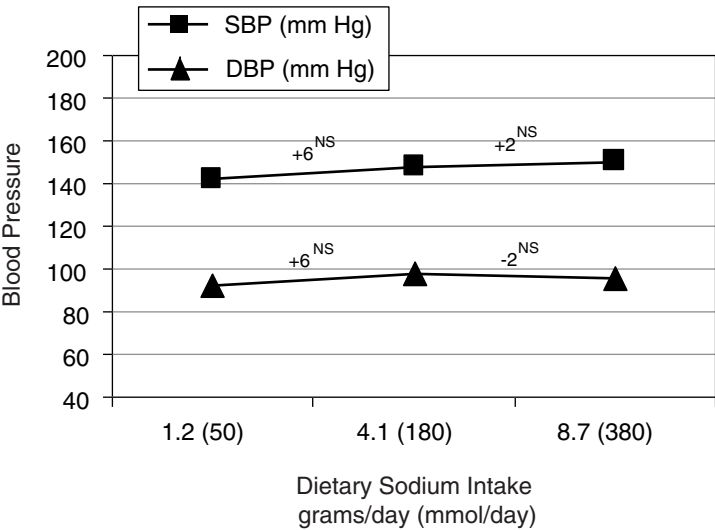


FIGURE I-9 Blood pressure (mm Hg) according to dietary sodium intake in g/d (mmol/d) among 12 hypertensive men and women. Each sodium level was provided for 4 d. NS = not significantly different. Data from Bruun et al. (1990).

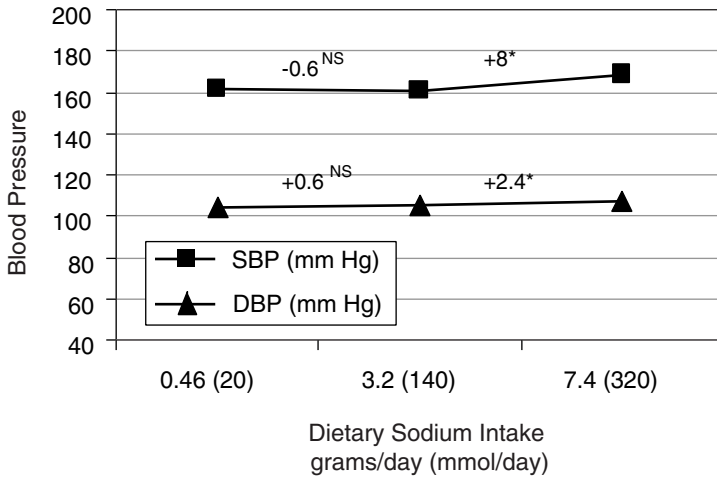


FIGURE I-10 Blood pressure (mm Hg) according to dietary sodium intake in g/d (mmol/d) among 61 hypertensive men. Each sodium level was provided for 2 wk. NS = not significantly different; * $p < 0.05$. Data from Ferri et al. (1996).

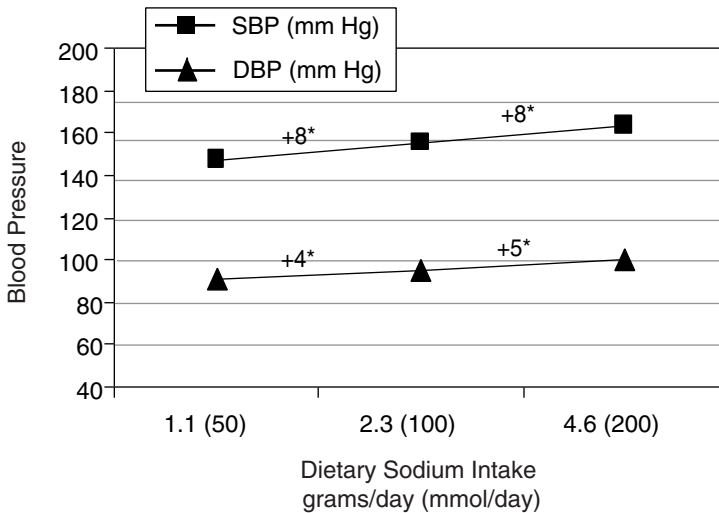


FIGURE I-11 Blood pressure (mm Hg) according to dietary sodium intake in g/d (mmol/d) among 20 hypertensive men and women. Each sodium level was provided for 4 wk. * $p < 0.01$. Data from MacGregor et al. (1989).

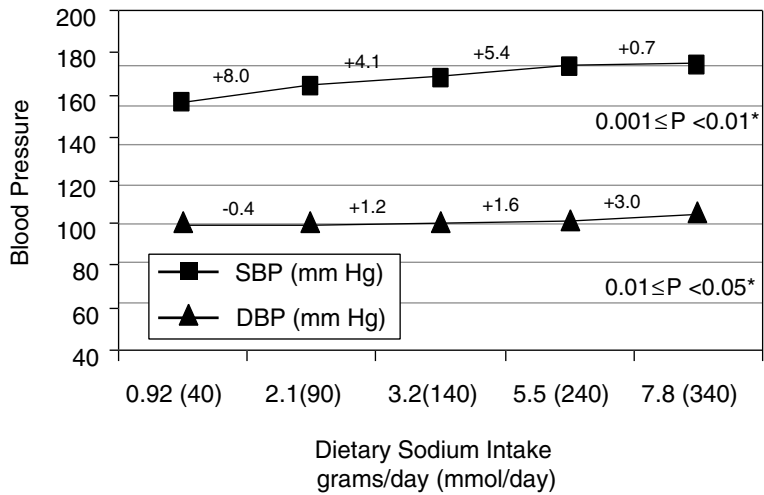


FIGURE I-12 Blood pressure (mm Hg) according to sodium intake in g/d (mmol/d) among 8 systolic diastolic hypertensive elderly subjects. Each sodium level was provided for 2 wk. *P-ANOVA simultaneously comparing the four pair-wise blood pressure differences between the lowest sodium level (baseline) and each of the four higher sodium levels. Data from Johnson et al. (2001).

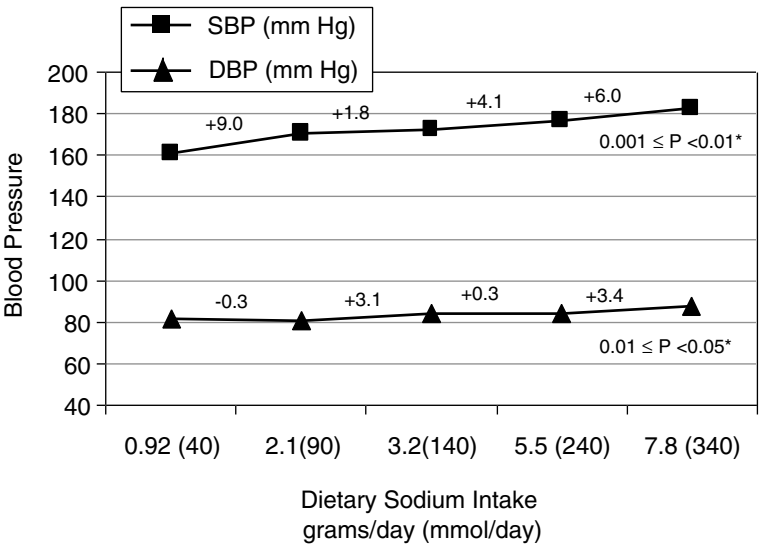


FIGURE I-13 Blood pressure (mm Hg) according to sodium dose in g/d (mmol/d) among 15 isolated systolic hypertensive elderly subjects. Each sodium dose was provided for 2 wk. *P-ANOVA simultaneously comparing the four pair-wise blood pressure differences between the lowest sodium level (baseline) and each of the four higher sodium levels. Data from Johnson et al. (2001).

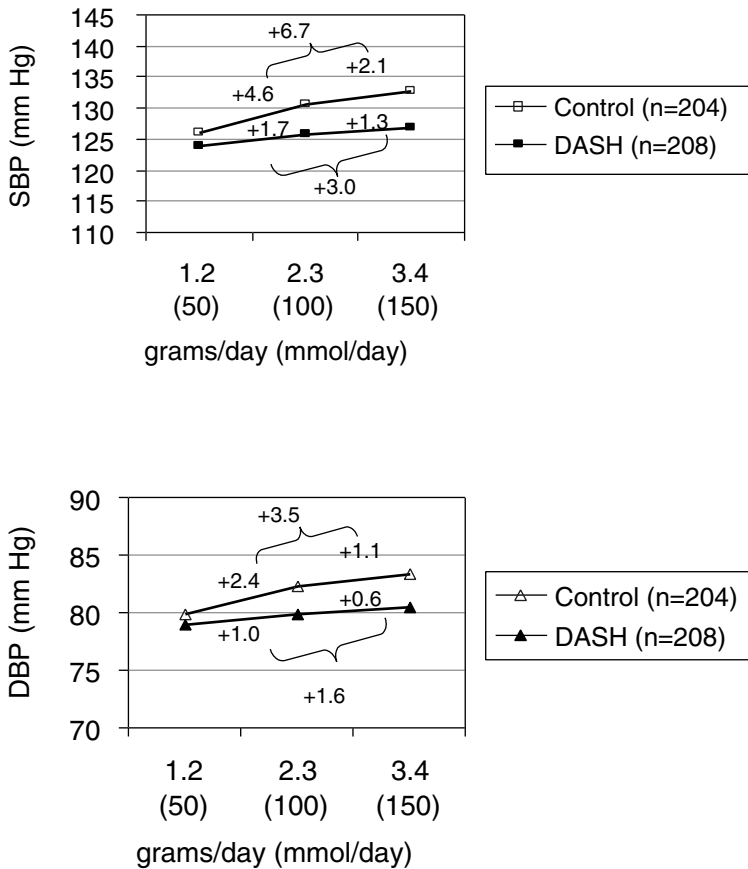


FIGURE I-14 Analyses from the Dietary Approaches to Stop Hypertension (DASH)-Sodium Trial: Effect of sodium level on systolic and diastolic blood pressure in 412 normotensives and hypertensive participants. Sodium levels defined as higher = 3.5 g/d/2,000 kcal (150 mmol/d), intermediate = 2.3 g/d/2,000 kcal (100 mmol/d), and lower = 1.2 g/d/2,000 kcal (50 mmol/d). Adapted with permission from Sacks et al. (2001). Copyright 2001 by the Massachusetts Medical Society.

TABLE I-1a Mean Blood Pressure by Diet and by Sodium Level, Dietary Approaches to Stop Hypertension (DASH)-Sodium Trial

Diet	Systolic			Diastolic		
	Higher	Intermediate	Lower	Higher	Intermediate	Lower
Control diet (<i>n</i> = 204)	132.8	130.7	126.1	83.4	82.3	79.9
DASH diet (<i>n</i> = 208)	126.9	125.6	123.9	80.5	79.9	78.9

SOURCE: Sacks et al. (2001).

TABLE I-1b Effect of Decreased Sodium on Systolic and Diastolic Blood Pressure, Control Diet (*n* = 204) in DASH-Sodium Trial

	Systolic			Diastolic		
	Mean Change	Standard Error	<i>P</i> -value	Mean Change	Standard Error	<i>P</i> -value
Higher to lower	−6.7	0.58	< 0.0001	−3.5	0.38	< 0.0001
Higher to intermediate	−2.1	0.58	0.0003	−1.1	0.38	0.0044
Intermediate to lower	−4.6	0.60	< 0.0001	−2.4	0.39	< 0.0001

SOURCE: Sacks et al. (2001).

TABLE I-1c Effect of Decreased Sodium on Systolic and Diastolic Blood Pressure, DASH Diet ($n = 208$), in DASH-Sodium Trial

	Systolic			Diastolic		
	Mean Change	Standard Error	<i>P</i> -value	Mean Change	Standard Error	<i>P</i> -value
Higher to lower	-3.0	0.58	< 0.0001	-1.6	0.37	< 0.0001
Higher to intermediate	-1.3	0.58	0.03	-0.6	0.37	0.09
Intermediate to lower	-1.7	0.59	0.003	-1.0	0.38	0.01

SOURCE: Sacks et al. (2001).

TABLE I-2 Design Features of Dose-Response Trials that Tested the Effects of Sodium Intake on Blood Pressure

Study	Figure (Appendix I)	Reference	N
<i>Nonhypertensive</i>			
1	1	Roos et al. (1985)	8
2	2	Sullivan et al. (1980)	6
3	3	Luft et al. (1979)	14
4	4	Fuchs et al. (1987), at risk of hypertension	17
	5	Fuchs et al. (1987), not at risk of hypertension	17
5	6	Kirkendall et al. (1976)	8
6	7	Bruun et al. (1990)	10
7	8	Johnson et al. (2001)	17
<i>Hypertensive</i>			
	9	Bruun et al. (1990)	12
8	10	Ferri et al. (1996)	61
9	11	MacGregor et al. (1989)	20
	12	Johnson et al. (2001), systolic-diastolic hypertension	8
	13	Johnson et al. (2001), isolated systolic hypertension	15
<i>Both nonhypertensive and hypertensive</i>			
10	14	Sacks et al. (2001) DASH ^c diet	208
		Control diet	204

^a Urinary sodium.
^b Urinary potassium.
^c DASH = Dietary Approaches to Stop Hypertension.

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Duration (days)	Feeding Study	Design	Range of Sodium g/d (mmol/d)		Potassium Level g/d (mmol/d)
			Lowest	Highest	
5	Yes	Dose-escalation	0.46 (20)	25.9 (1,128)	3.1 (80)
4	Yes	Crossover	0.23 (10)	9.2 (400)	2.3 (60)
3–7	Yes	Dose-escalation	0.23 (10)	34.5 (1,500)	3.1 (80)
9	No	Crossover	3.7 (16) ^a	5.5 (239) ^a	≈ 1.9 (50) ^b
9	No	Crossover	0.18 (8) ^a	5.6 (245) ^a	≈ 1.9 (50) ^b
28	Yes	Crossover	0.23 (10)	9.4 (410)	3.9 (100)
4	Yes	Crossover	1.2 (50)	8.7 (380)	3.1 (80)
14	Yes	Crossover	0.92 (40)	7.8 (340)	≈ 1.2 (30) ^b
4	Yes	Crossover	1.2 (50)	8.7 (380)	3.1 (80)
14	Yes	Crossover	0.46 (20)	7.4 (320)	2.7 (70)
28	No	Crossover	1.2 (50)	4.6 (200)	2.7 (70)
14	Yes	Crossover	0.92 (40)	7.8 (340)	≈ 1.2 (30) ^b
14	Yes	Crossover	0.92 (40)	7.8 (340)	≈ 1.2 (30) ^b
28	Yes	Crossover	1.5 (67) ^a	3.3 (144)	3.1 (79) ^b
28	Yes	Crossover	1.5 (64) ^a	3.2 (141) ^a	1.6 (41) ^b

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