



Garlic, Chocolate & Tomatoes good for blood pressure or cholesterol?

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Cardiovascular Health

- CVD no.1 killer
 - 1 in 6 Australian (3.2 million)
 - 1 Australian dies every 10 min from CVD
- 30% of adult Australians have high blood pressure
- 50% of adult Australians have high cholesterol
- Direct health system costs: \$11 billion
 - CHD most costly singly condition, \$1.8 billion
 - Stroke \$1 billion
 - 22% of total disease burden, 600,000 years of healthy life

Standard treatment: Hypertension

- SBP/DBP: >140/90 mm Hg
 - Prescription: ACEI 56%
 - A2RA 27%
 - CCB 19%
 - Diuretics, Beta Blockers
 - BP target: Monotherapy 40%
 - Combination of two agents 40%
 - More than 2 agents 20%
 - Side effects: fatigue, dizziness, cough, headache, myalgia, gastrointestinal upsets, angioedema, renal impairment, hyperglycaemia

Ref: Simons MJA 2008

Our research

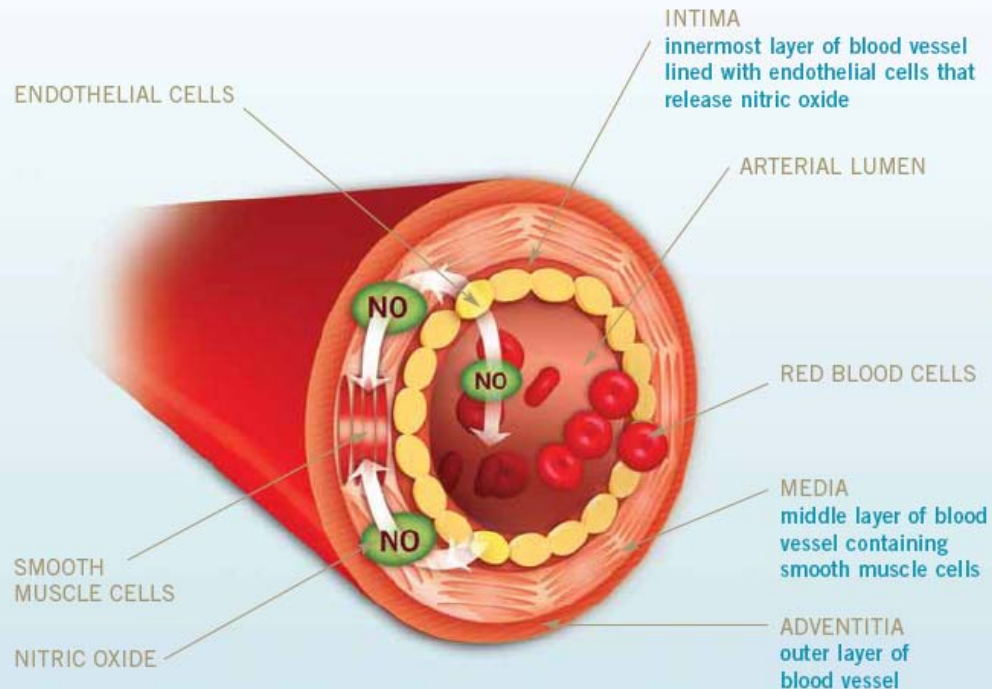
- Nutritional medicine for cardiovascular health
 - Effect of non-pharmacological treatment on blood pressure and blood lipids
 - Garlic for hypertension
 - Chocolate for hypertension
 - Lycopene for hypertension
 - Lycopene for hypercholesteremia



Garlic for hypertension

- Blood pressure lowering properties
 - Stimulates nitric oxide & H₂S production
 - Blockage of Angiotensin II production
 - Promotes Vasodilation

Production of Nitric Oxide (NO) in Arteries



Ref: Al-Qattan J Nutr 06;
Benavides PNAS 07

Garlic



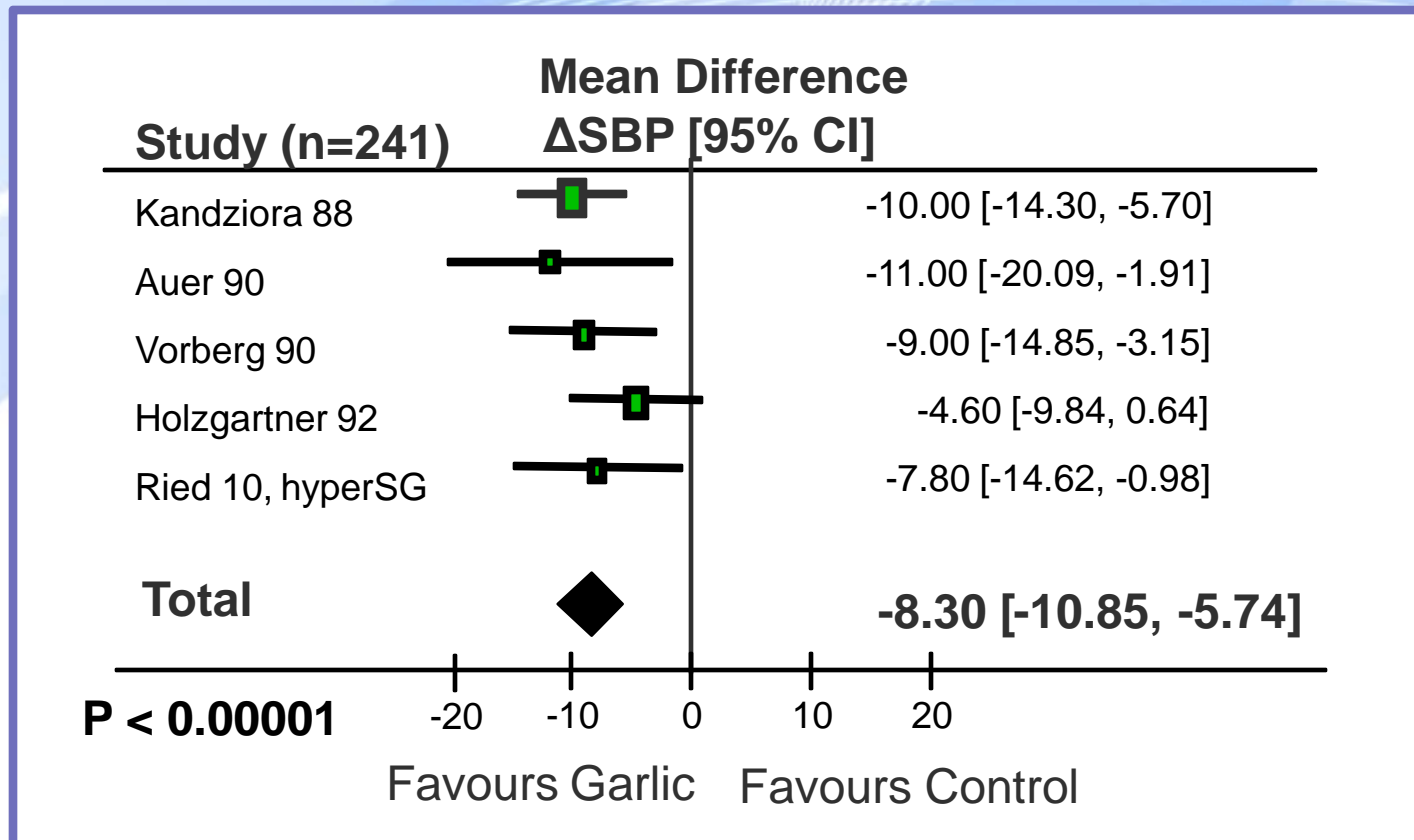
Which garlic for blood pressure?

Active ingredients: organo-sulphur components

- water-soluble; garlic oil not effective
- cooking of fresh garlic destroys allicin
- Raw garlic toxic in high dosages
- Effective: garlic powder
- **Best: aged garlic extract (Kyolic)**
 - 20-month long ageing process
 - eliminates odour, toxicity, haemorrhage-causing oil soluble components
 - Dosage stable & standardisable, S-allylcysteine (SAC)

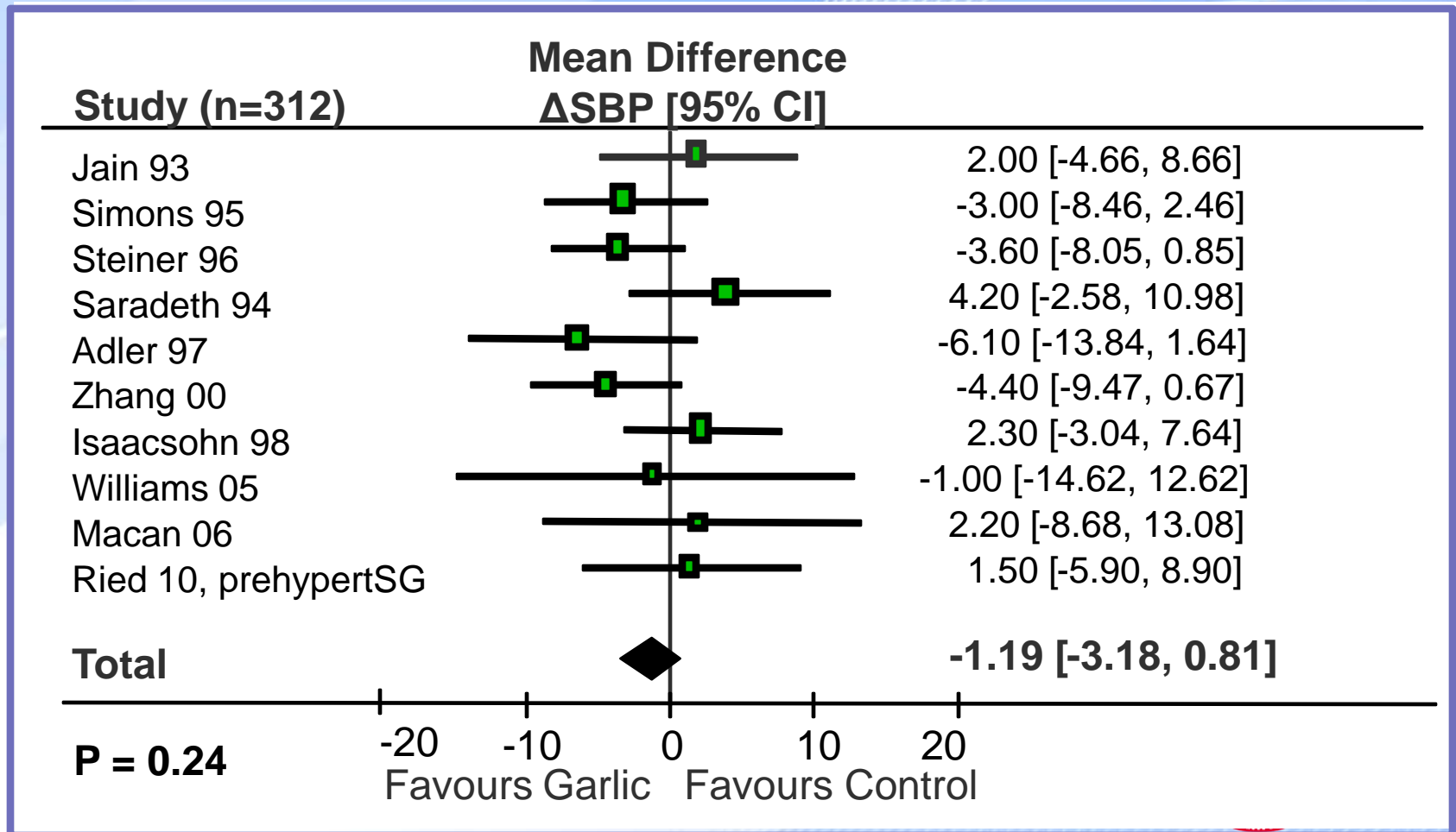
Garlic & BP: Meta-analysis

- Our meta-analysis ^{Ried BMC 08}, 14 trials, n = 673
- Garlic reduced SBP 8 mm Hg, DBP 7 mm Hg in **Hypertensives**



Garlic & BP: Meta-analysis

- But not in Normotensives



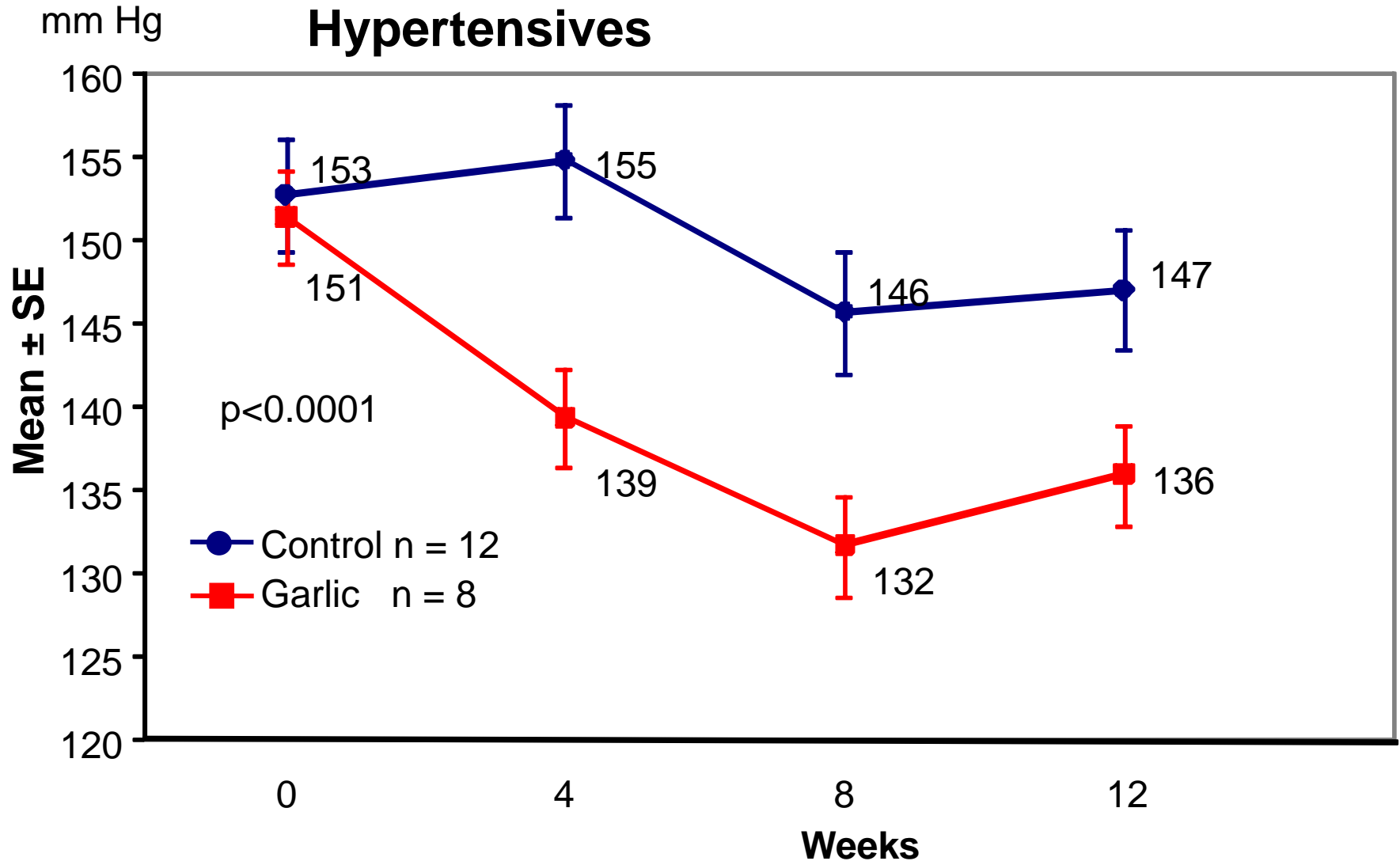
Our trial:

Aged garlic extract for uncontrolled hypertension

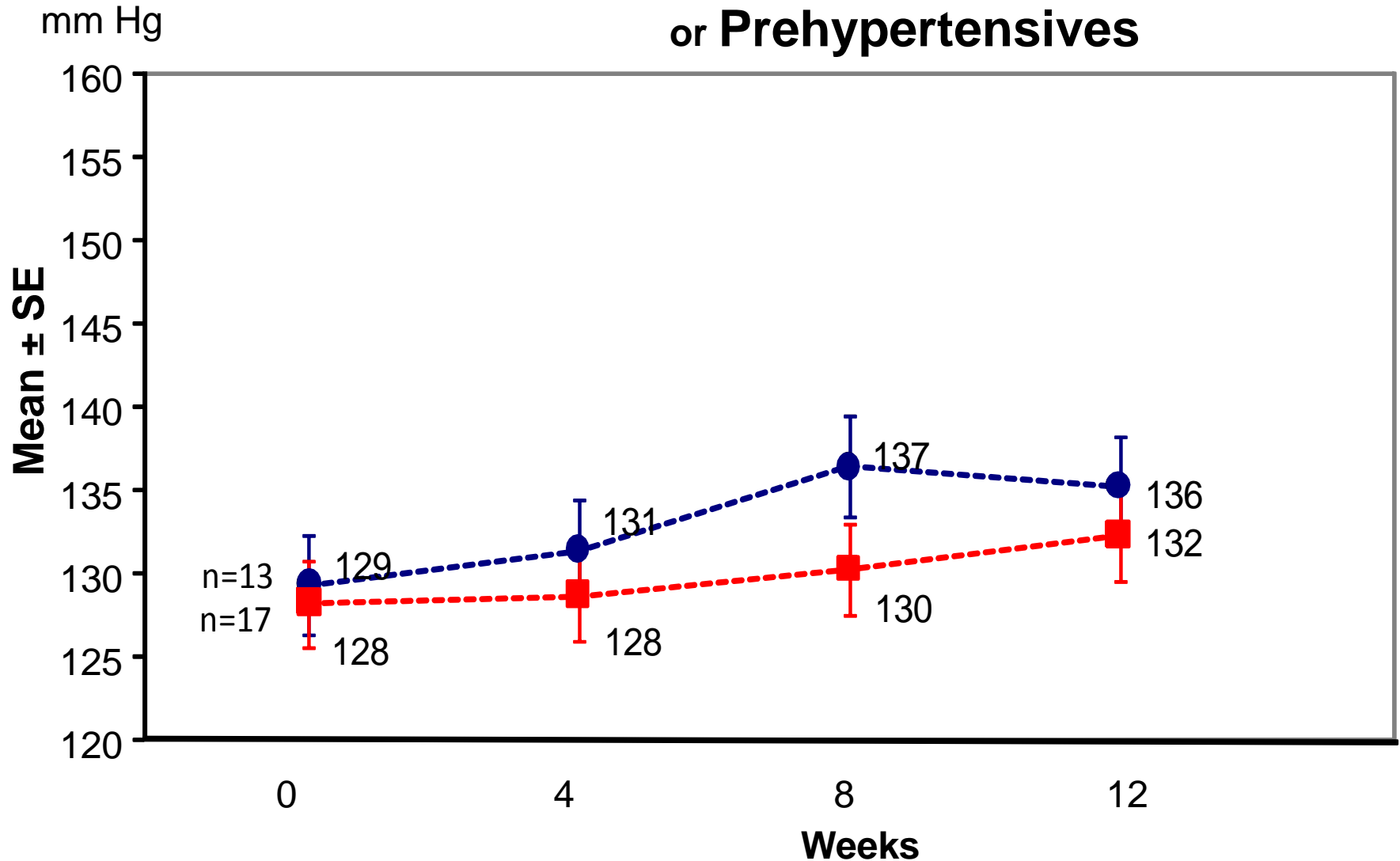
- 50 patients
 - on BP medication (1-4 classes)
 - hypertensive on medical record
- Group 1: Aged garlic extract (Kyolic)
 - 4 capsules/day, 960mg AGE, 2.4 mg SAC
 - Equivalent to 2.5 g fresh garlic
- Group 2: Placebo
- 12 weeks

Ref: Ried Maturitas 2010

Garlic for treated uncontrolled hypertension



Garlic for treated uncontrolled hypertension or Prehypertensives



Aged garlic extract - Tolerability

- 92% found it acceptable treatment
- 2 withdrew (garlic, 8%) after 1 or 2 months: gastrointestinal complaints
 - Reduced detoxification capacity of sulphur-compounds may be treatable with Mo/VitB12 supplementation
- 8% in garlic group felt better: calmer, less stressed

Garlic & BP: Summary

- Aged garlic extract is effective in reducing blood pressure in hypertensives on a clinically significant level similar to first line medication
 - Aged garlic extract was well tolerated and can be taken with other BP medications
 - Studies have shown no adverse effects if taken with blood thinning, blood sugar regulating, or anti-inflammatory drugs (e.g. warfarin, aspirin, NSAID)^{Macan JNutr 06; Izzo Drugs 09}
 - Effective dose in our trial: 4 tablets of Kyolic High Potency Formula (960 mg AGE, 2.4 mg SAC)

Garlic & BP: next steps

- Dose-response trial
 - Half/quarter of the dose (2 or 1 tablet per day)
- Replacement trial
 - Can Kyolic safely replace other BP medication in a patient's treatment regime? – particularly for patients on ≥ 2 classes of BP medication
 - Reduce complexity, side effects, costs
 - Kyolic High Potency: 1 capsule \$0.25; 4 caps/day \$1
 - ACEI, A2RA, Diuretics: \$1/day; BB, CC: \$0.5/day

Chocolate for hypertension

- Blood pressure lowering properties

- Polyphenols/ flavanols
- Simulation of nitric oxide production
- Vasodilation
- Improved endothelial function



- Cocoa products

- Dark chocolate (70-85% cocoa)
- Halbbitter chocolate (50% cocoa)
- Flavanol-containing drinks, bars, pills

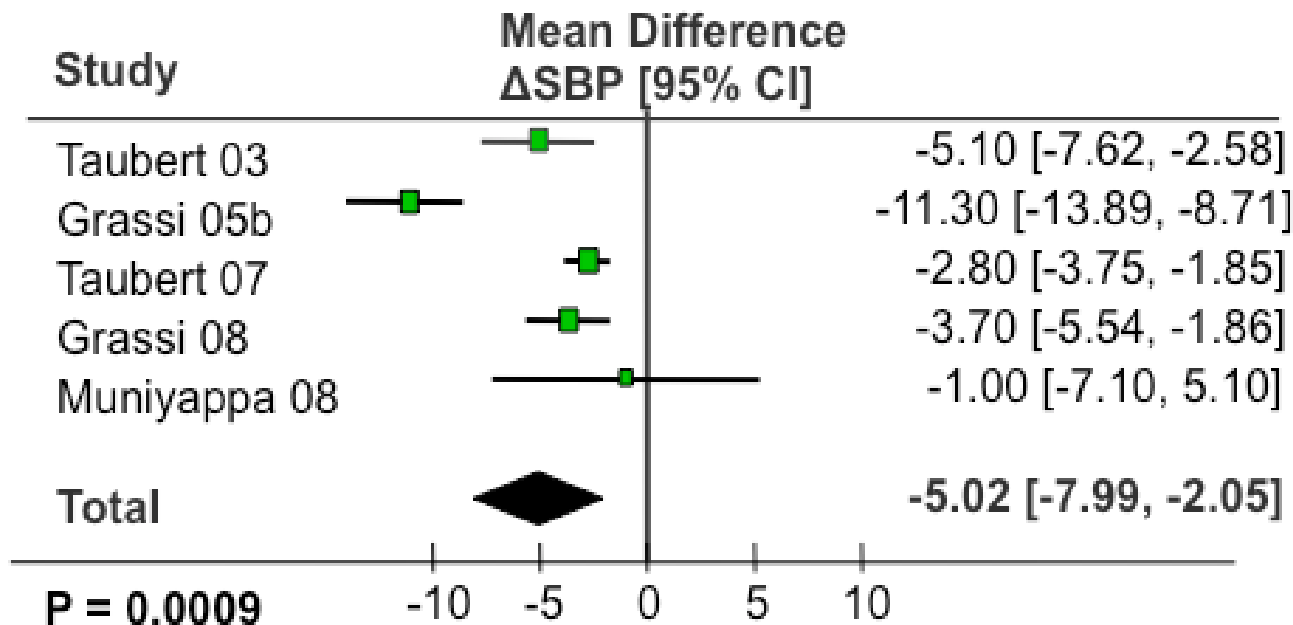


Ref: Fisher J Hypertens 06; Karim J Nutr 00

Chocolate & blood pressure trials

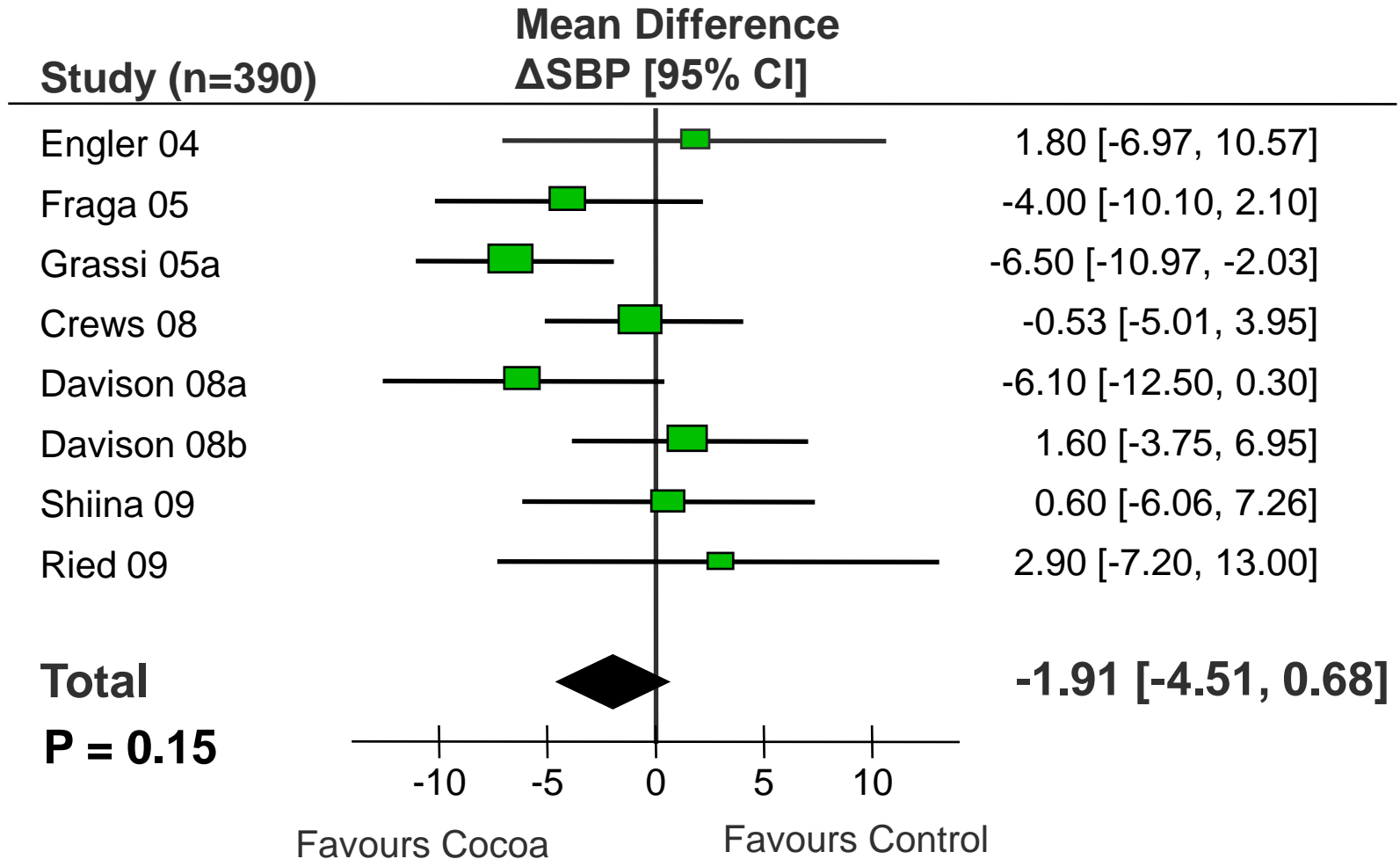
- Our meta-analysis ^{Ried BMC10}, 13 trial arms, n=578
 - Dosage: 1 piece (6g) to 1 block (100g) chocolate/day, 30-1000 mg/day of flavanols
 - Duration: 2 weeks (8), 6-18 weeks (5)

Hypertensives (n=188)

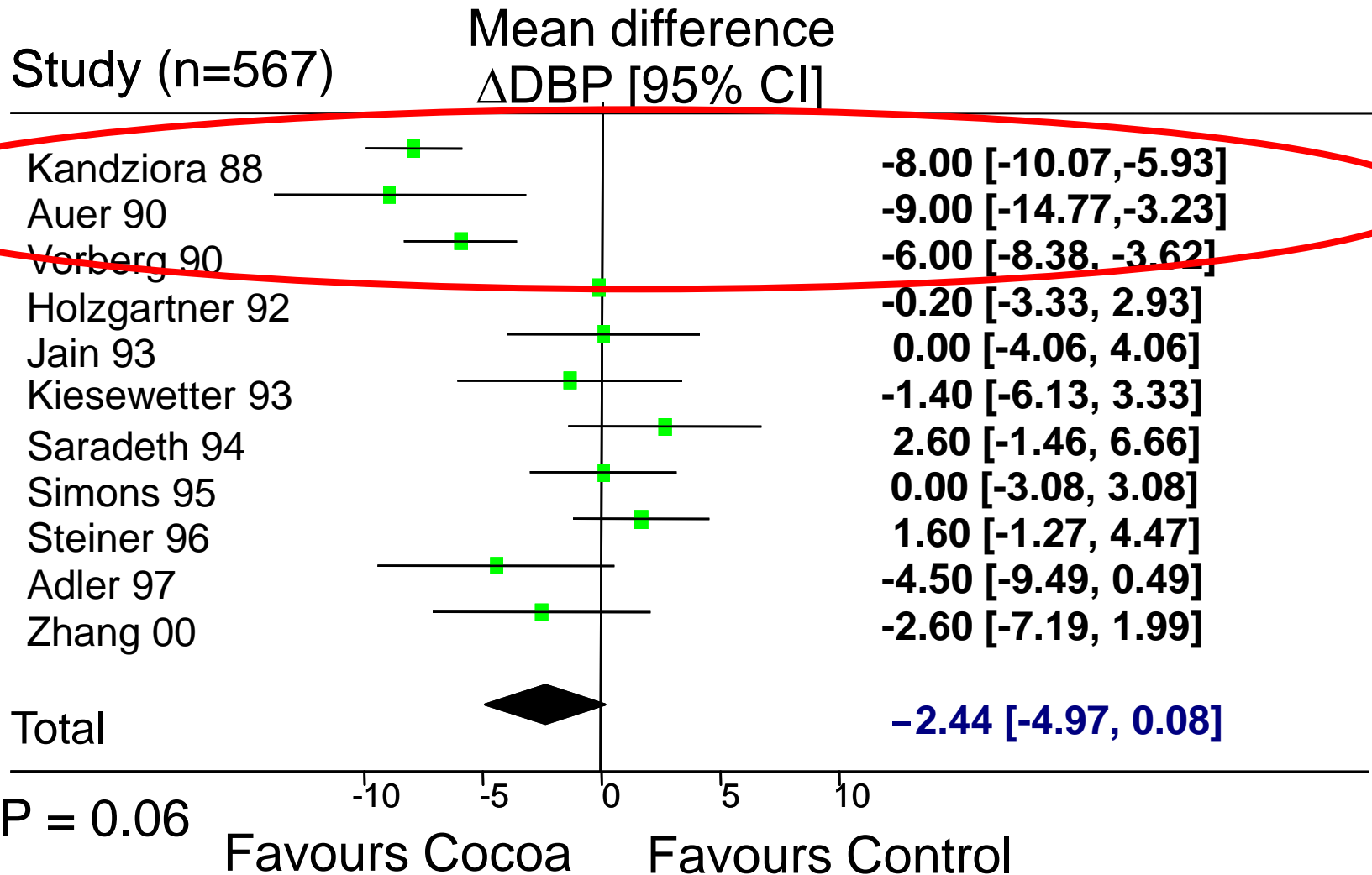


Chocolate & SBP₍₂₎

■ SBP normotensives



Chocolate & DBP



Chocolate & BP : Summary

- Dark chocolate/ flavanol-rich cocoa superior to placebo in reducing systolic hypertension and diastolic prehypertension
- Chocolate did not significantly reduce BP in normotensives
- Future research may explore local dietary habits/genetic factors in relation to the effect of cocoa in hypertensive populations

Lycopene

- Tomato
- Watermelon, guava, papaya, pink grapefruit, rosehip

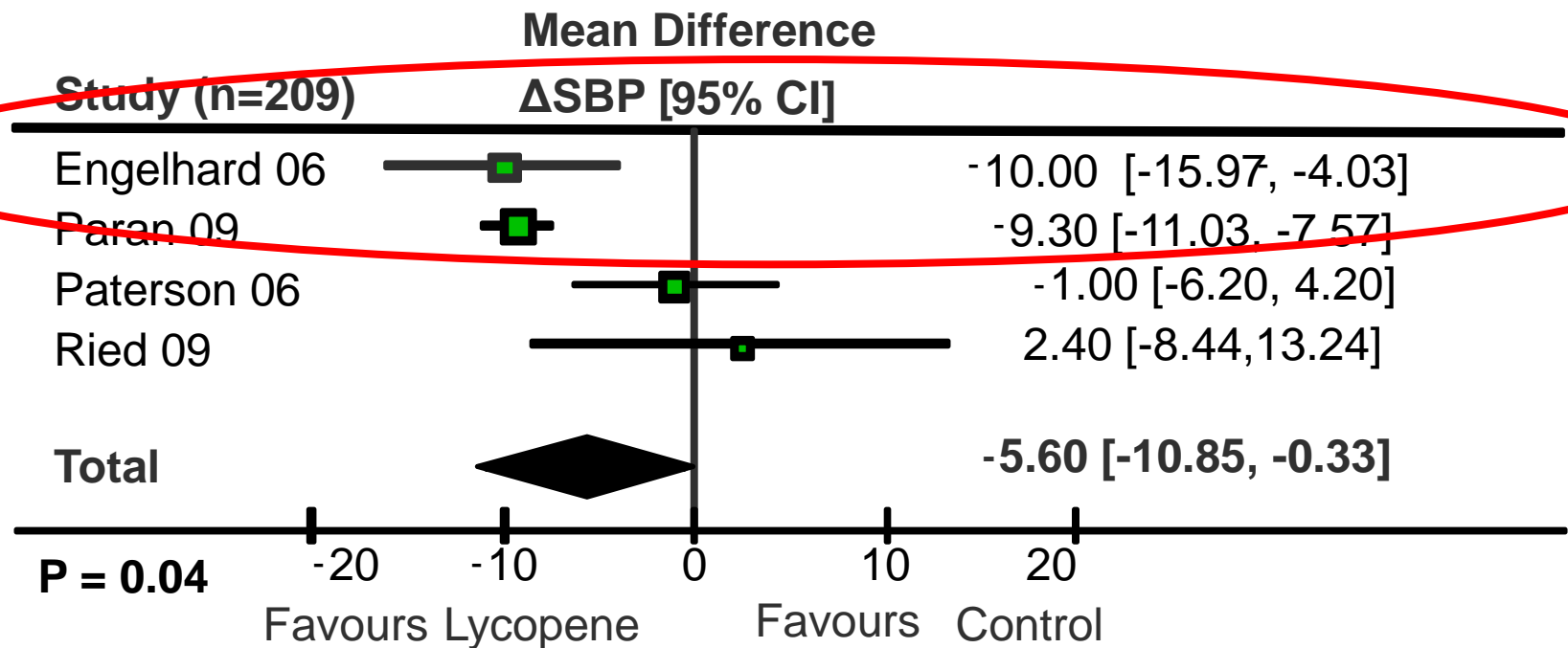


- Lyc-O-Mato tomato-extract capsules



Lycopene for hypertension

- Bioavailability higher when cooked & processed
- Highest in tomato paste, tomato juice
- BP lowering properties: nitric oxide stimulation



Cholesterol

- Standard treatment: Hypercholesterolemia
 - Statins, fibrates
 - Adverse effects: myalgia, neuropathy, gastrointestinal problems, cognitive loss, pancreatic or hepatic dysfunction ¹
- The body needs cholesterol
 - Cell membranes, bile acid, steroid hormones incl. cortisol and sex hormones, Vit D, myelin sheath
- Lycopene has cholesterol-lowering properties
 - Antioxidant, suppression of cholesterol synthesis, increase of LDL degradation, inhibition of HMGCoA reductase ²

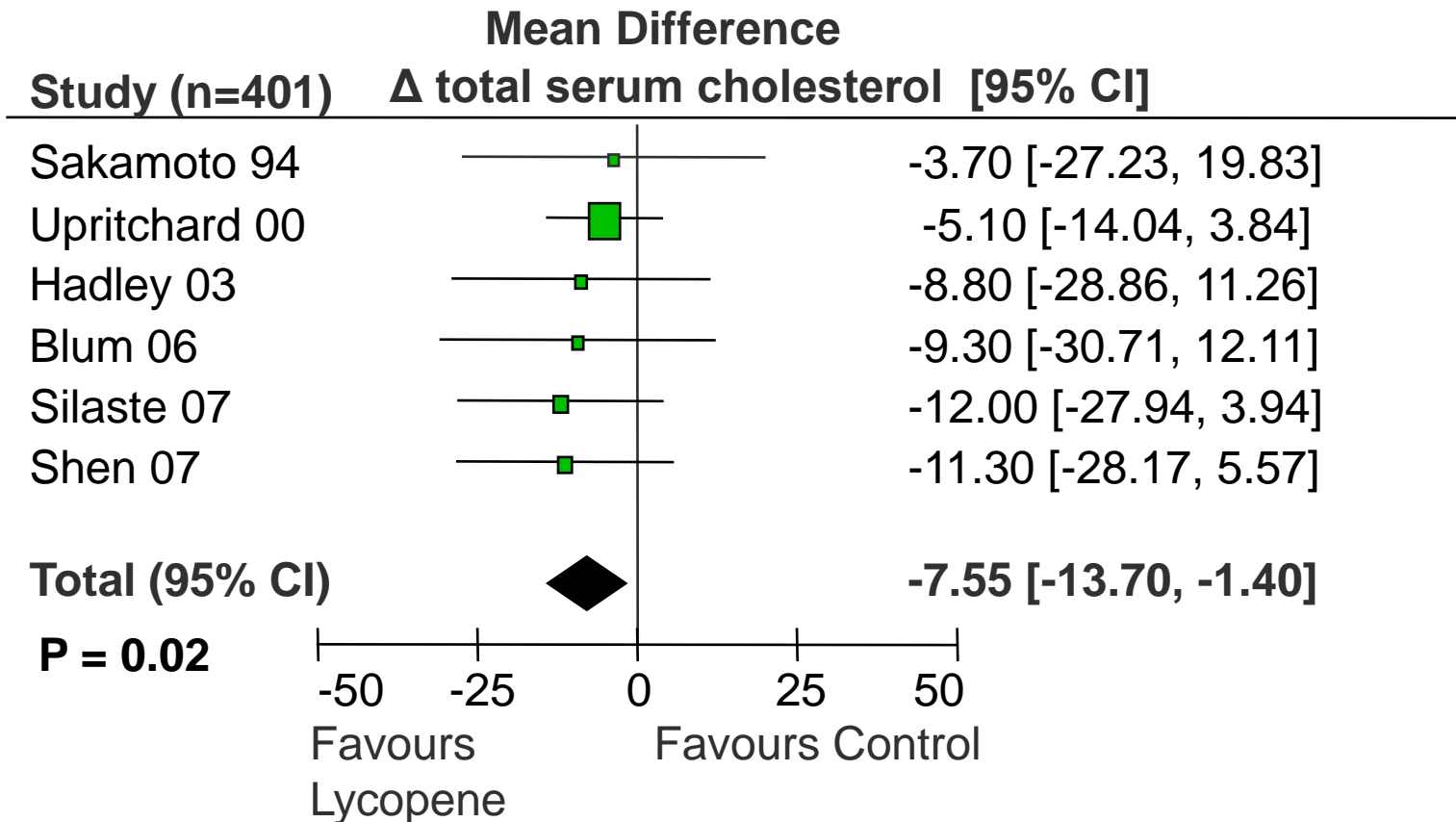
Ref-1: Sinzinger 02; Moosmann 04; Jeppesen 99

Ref-2: Basu 07, Willcox 03, Fuhrman 97

Lycopene & cholesterol

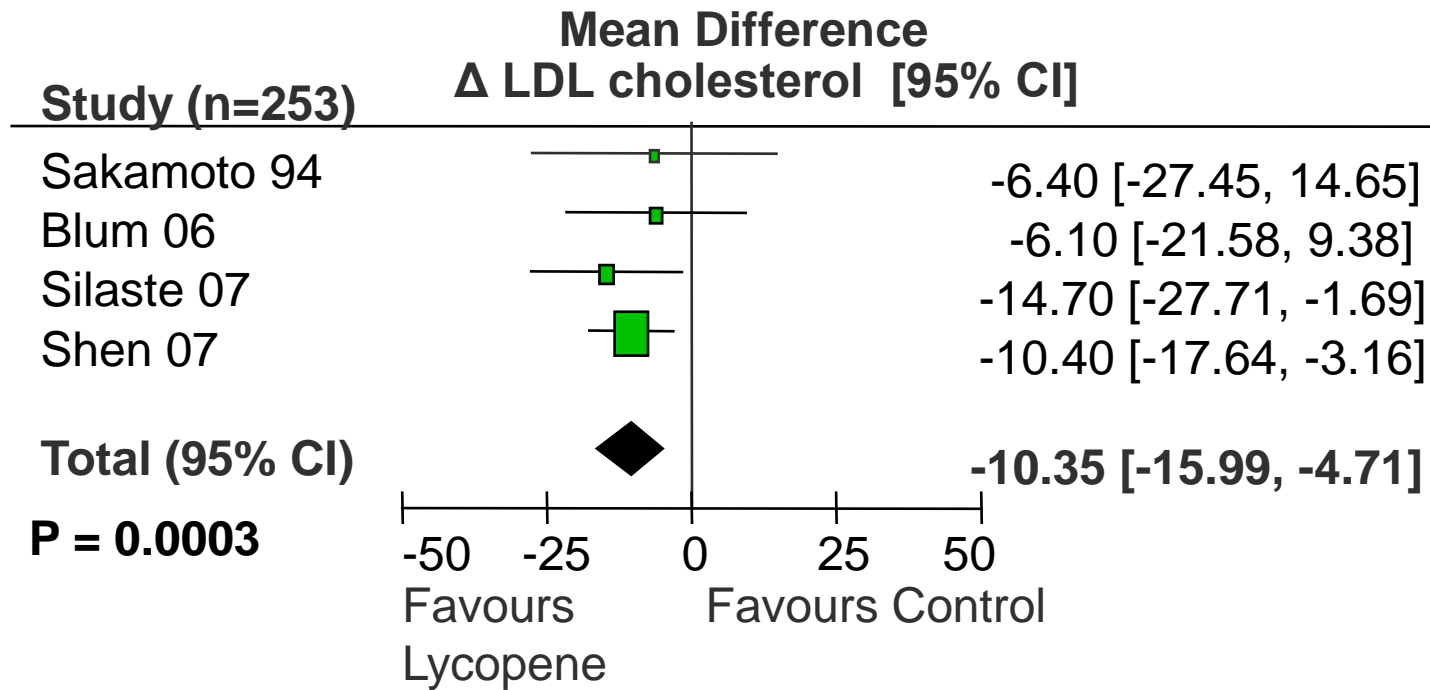
- Our meta-analysis^{Ried Maturitas}11, 15 trials, n=694

High lycopene dosage ≥ 25 mg/ day:



Lycopene & LDL cholesterol

High lycopene dosage ≥ 25 mg/ day:



Lycopene & cholesterol: Summary

- Lycopene significantly lowered serum cholesterol & LDL cholesterol
- By 10% comparable to low dose statins in patients with slightly elevated cholesterol levels
- If taken in doses ≥ 25 mg/day, equivalent to
 - 500ml tomato juice or 50g tomato paste / day
 - 2 capsules of Lyc-O-Mato tomato extract capsules
- No adverse effects
- Lycopopenemia: orange discolouration of palms
1 case study: 2 litres of tomato juice daily (200 mg lycopene) over several years

Conclusions

- Garlic, chocolate or tomatoes effective in lowering blood pressure in hypertensives
 - Aged garlic extract (Kyolic) comparable to first line standard blood pressure medication
- BP lowering action biologically plausible
- Lycopene effective in lowering cholesterol comparable to low dose statins
- Minimal side effects



References

- Ried K et al. Effect of garlic on blood pressure: a systematic review and meta-analysis. BMC Cardiovasc Disord 2008;8:13.
- Ried K et al. Does chocolate reduce blood pressure? A meta-analysis. BMC Med 2010;8:39.
- Ried K et al. Aged garlic extract lowers blood pressure in patients with treated but uncontrolled hypertension: A randomised controlled trial. Maturitas 2010;67:144-50.
- Ried K, Fakler P. Protective effect of lycopene on serum cholesterol and blood pressure: Meta-analyses of intervention trials. Maturitas 2011;68(4):299-310.
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