

	<b>Reference</b>	<b>Study Objective</b>	<b>Intervention</b>	<b>Methods</b>	<b>Results</b>
1	AbuMweiss, Ames 2010 Canada, Wpg, U Manitoba Meta Analysis	Meta analysis of trials of barley beta-glucan on lipid lowering capacity	MetaAnalysis of results of 11 randomized crossover clinical trials of barley $\beta$ -glucan on blood lipids – mean BG dose = 5 g/day	Statistical Analysis of the results for Total, LDL and HDL Cholesterol, and for Triglycerides	BG - Total Chol $\downarrow$ 0.30 mmol/l, LDL $\downarrow$ 0.27 mmol/l, HDL = NS, TRG = NS compared to control
2	Vitaglione 2009 U Napoli Italy, 14 Adult M/F	Effect of beta-glucan on energy intake and release of peptide YY and plasma ghrelin	Diet containing breads with or without 3 g of beta-glucan from Glucagel	Randomized crossover, placebo controlled, subjects with BMI mean = 22.9	19% $\downarrow$ in energy intake 23% $\downarrow$ in Ghrelin 16% $\uparrow$ in Peptide YY $\downarrow$ glucose response
3	Vitaglione 2010 U Napoli Italy, 20 Adolescent M/F	Effect of beta-glucan on energy intake, appetite, satiety hormones	Snack biscuit with (5.2%) or without barley beta-glucan (Glucagel & Barley Balance) served midmorning	Randomized, placebo controlled crossover trials. Subjects were adolescent M/F	$\downarrow$ AUC Appetite w BG $\downarrow$ Energy intake F only $\uparrow$ AUC Satiety w BG
4	Thondre, Henry Oxford B UK vitro digestion model	2010 Effect of beta-glucan (Barley In Balance) on particle breakdown in starch digestion	In vitro digestion model simulation of starch digestion with and without beta-glucan in chapatis	Simulation model of human digestive system – chapatis with 0%, 4% & 8% BG	Beta-glucan slowed the rate of particle breakdown and digestion of starch
5	Smith, Slavin, Fulcher U Minnesota US 90 Adult M/F	2008 Physiological Effects of two different MW $\beta$ -glucans on blood lipids and weight control	Diet containing beverage mix with 6 grams daily of a high or low molecular weight barley BG extract in 6 week trial	Randomized double blind parallel groups in diet with HMW or LMW barley $\beta$ - glucan	LMW - $\downarrow$ LDL $\downarrow$ CRP LMW - $\downarrow$ Weight HMW - $\downarrow$ Weight
6	Aurora 2009 Imperial College UK, Mice	Prebiotic, Probiotic & Symbiotic Feeding and Obesity in Mice	Diets with Control, Prebiotic beta-glucan (BG), and symbiotic BG + yogurt (Fibar)	Randomized, placebo controlled 21 day trial with 0,1,2,3 and 4 % BG	$\uparrow$ Microbial, $\downarrow$ pH, $\uparrow$ gut hormones, $\uparrow$ satiety with BG $\uparrow$

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7	Thondre, Henry 2009 OxfordB UK 8 Adult M/F	Reduction of glycemic index and glucose response to beta-glucan	Diet with 0,2,6 & 8% beta-glucan in finished food – whole wheat chapattis, with glucose control (Fibar)	Randomized, single blind, placebo controlled, healthy subjects with BMI <30	↓ 43% in GI 4g ↓ 47% in GI 8g ↓ 71% in GI compared to glucose control
8	Shimizu 2007 Sapporo Japan 44 Adult M	Effect of beta-glucan on serum cholesterol and visceral fat in men	Diet with rice (control) and 50-50 rice & pearled barley high in BG (Fibar)	Randomized, double blind, placebo control for 12 week period	↓ 8.2%, TC ↓ 7.4% LDL ↓ Visceral fat ↓ BMI
9	Wilson 2004 U Mass US 30 Male Hamsters	Effect of High MW & Low MW barley beta-glucan on Total & LDL Cholesterol	Diet containing a High MW BBG or a Low MW BBG at 8g/100g over 6 weeks – TC, LDL, HDL, TG	Randomized, double blind, placebo controlled trial for 6 weeks + 2 week lead in	↓ LMW 36%TC, 50%LDL ↓ HMW 32%TC, 43%LDL No difference between LMW & HMW
10	Pins 2000 U Minnesota U.S. 60 Adult M/F	Reduction of cholesterol and increased satiety	Diet with 4 muffins/day, wheat bran control, barley enriched BG and barley bran	Randomized, stratified double blind, 6 week AHA Step 1 Diet & 4 week trial phase	Beta glucan group had ↓ 7.8% TC ↓ 8.22% LDL ↑ satiety ↓ weight
11	Jenkins 2005 – U Toronto, Canada 34 Adult M/F	Comparing diet cholesterol lowering foods & statins	Diets – low fat control diet, low fat diet + 20 mg lovastatin, combination diet with fibers, sterols, nuts & vegetables	Randomized, placebo controlled, double blind, crossover trial, 12 weeks	↓ 8.5% LDL (low fat diet only), ↓ 33.3% (diet + statin) ↓ 29.6% ↓ (combo diet)
12	Pascoe 2008 U Minnesota US Immune cells	Study effect of cereal cellwall material (BG) on the immune system	Human immune cells in culture exposed to cereal cellwall polysaccharides	In vitro, human macrophage cells exposed to highly purified BG	TNF α stimulation at 5 ug/ml = .35TNF/cell 10 ug/ml = .58TNF/cell
13	Sealey 2008 U Idaho/USDA U.S. Rainbow trout	Evaluate efficacy of barley BG on immune response in trout	Control diet (wheat), 3 barley diets (L, M, H BG) + Control with yeast BG Alamo (Barley Balance)	Randomized, placebo controlled trial, 9 week viral challenge group	Barley BG led to increased disease resistance – same as yeast BG

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14	Causey 1998 U Minnesota U.S. Macrophage Cells	Evaluate stimulatory effects of cereal BG on human macrophages	Human macrophage cells isolated from blood in culture – exposed to BG from cereal.	In vitro, human macrophage cells exposed to highly purified BG	Barley beta-glucan treated culture showed a 6 fold increase in macrophage cells
15	Leatherhead Res 2007 Leatherhead UK Prebiotic Model	Study of prebiotic fibers to determine fermentation, SCFA, and functionality	Prebiotic fibers digested and fermented in digestive model Alamo	Human digestive simulation model testing a broad array of prebiotic fibers	Barley Balance was gradually fermented ↑ bifidobacteria ↑ butyric acid
16	Snart 2006 – U Alberta Canada Rats	Study effect of high viscosity barley beta-glucan on Lacto-bacilli in rat cecum	Rats fed casein based diet with 1) barley flour, 2) oat flour, 3) cellulose, 4) high beta-glucan or 5) control	Random, placebo controlled study using pregnant rats and their offspring, 35 days	Rats fed high viscosity beta-glucan diet had significantly more Lactobacillus cells.
17	Behall 2004 USDA HNL U.S. 18 Adult Males	Effect of barley beta-glucan on lipid risk factors for cardiovascular disease	Subjects consumed trial diets with 0, +3g, & +6g barley soluble fiber + NCEP Step 1 diet -	2 wks on Step 1 diet; crossover Latin Square design; 15 weeks	Result for 3g, 6g BG ↓ 10.8%, ↓ 16.6% TC ↓ 16.6%, ↓ 23.8% LDL ↑ 3.7%, ↑ 7.3% HDL
18	Behall 2004 USDA HNL U.S. 7 M, 9 F, 9 F	Effect of barley beta-glucan on lipid risk factors for cardiovascular disease	Subject consumed trial diets with 0, +3g, & +6g barley soluble fiber + NCEP Step 1 diet – 7 males, 9 pre-meno-pause & 9 post menopause F	2 wks on Step 1 diet; crossover Latin Square design; 15 weeks	Result for 3g & 6 g BG ↓ 9%, ↓ 10% TC ↓ 13.8%, ↓ 17.4% LDL
19	Kim 2006 USDA HNL U.S. 19 Adult M/F	Effect of barley rich in beta-glucan on short term satiety and glycemic response	Overweight subjects consumed meals (cereal + yogurt) made with whole grain with 0g, 1 g and 2 g of BG & a glucose control	Randomized, placebo controlled study with women and men	Results for 2 g BG women - ↓glucose, ↑satiety men ↔glucose, satiety

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20	Talati 2009 U Connecticut US Review	Effect of barley fiber (BG) on serum lipids from 8 clinical trials	Subjects ranged from 10 to 155 in number – barley BG consumed as food/beverage	Study of 8 randomized controlled trials of 4-12 weeks with lipid tests	↓ 13.4 mg/dl TC mean ↓ 10 mg/dl LDL mean ↓ 11.8 mg/dl TG mean
21	Chilo 2011 Oxford B U.K. 9 Adults	Analysis of B-glucan extracts as source of polyphenols and anti-oxidants	Chemical evaluation of polyphenols and anti-oxidants in barley fractions, for reducing free radicals Subjects (Mean age 50.3 + 5.3 yrs) consumed	Acetone, methanol, acidified methanol/H <sub>2</sub> O ethanol extractions	Barley Balance anti-oxidants and poly-phenols – 81% free radical reducing power
22	Rodanelli 2011 U Pavia Italy 24 M Adults	Effect of barley beta-glucan on lipid risk factors for cardiovascular disease	foods with or without 7% barley BG soluble fiber, or rice bran + NCEP Step 1 diet lead in	3 wks on Step 1 diet; crossover Latin Square design; 14 weeks, blood draws at 0,21,49, 70 and 98 days	Barley Balance BG ↓8.6% Avg LDL Chol ↓5.0% Avg Total Chol ↓= 0.33 mmol/l in LDL
23	Tada 2009 TokyoU, Japan macrophage cells	Effect of barley beta-glucan on dectin-1 receptor – activates immune response	Barley beta-glucan tested with human macrophage cell lines to determine cytokine production	In vitro macrophage cells exposed to barley beta-glucan – NF-kB activation	Immunostimulative effects of barley beta-glucan may be exerted via dectin-1 receptor
24	Tiwari 2011 – Ireland, Dublin Meta-analysis	Meta-analysis of 126 selected studies of cereal beta-glucans on blood lipids and glucose	Meta-analysis examined 126 clinical studies of oat and/or barley beta-glucans on key health parameters.	Statistical analysis of the results of trials	Meta-analysis showed ↓ of 0.60 mmol/l TC ↓ of 0.66 mmol/l LDL ↓ of 0.04 mmol/l TAG
25	Thondre, Henry 2010 – UK, Oxford Laboratory analysis	Analysis of B-glucan extracts as source of polyphenols and anti-oxidants	Chemical evaluation of polyphenols and anti-oxidants in barley fractions, for reducing free radicals	Acetone, methanol, acidified methanol/H <sub>2</sub> O ethanol extractions	Barley Balance anti-oxidants and poly-phenols – 81% free radical reducing power