Peanut CRSP Final Report for Project ___ 2008-2012

Title: Peanut Consumption and Human Weight management

1. Final Summary

a. **Overall goal**

The goal of our work was to document the effects of peanut consumption on appetite, food intake, body weight, lipid profiles, glycemia and inflammation. This information was sought to substantiate that peanut consumption holds health benefits in terms of chronic disease risk without posing a threat for weight gain.

b. Significant Technical Achievements

Our work demonstrated that moderate peanut consumption does not promote weight gain. This is due to three mechanisms. First, peanuts have high satiety value so evoke strong dietary compensation. It approximates 67-75% of the energy provided by the peanuts. Second, the efficiency of absorption of energy from peanuts is less than theoretically predicted due to limited bioaccessability. Thus, another 5-10% of energy contributed by peanuts is lost in the stool. Third, chronic peanut consumption is associated with an increase in resting energy expenditure. This may account for another 10-15% of the energy provided by the peanuts. Thus, taken together, peanuts may be consumed in moderation with limited impact on body weight. At the same time, peanut consumption lowers LDL-cholesterol and total cholesterol, enhances fat oxidation, blunts glycemia and may reduce blood pressure and inflammation. As a result, they lower chronic disease risk. Additionally, we demonstrated that daily peanut consumption is well tolerated by non-consumers and that the addition of flavors to peanuts does not compromise their health effects.

b. Significant Issues and Challenges

Confirmation of our findings in longer-term clinical trials is necessary to ensure recommendations to increase peanut consumption are safe and healthful. The patterns of peanut use are also important to study. Whether they hold the same properties when added to foods or when consumed alone as snacks will determine public health recommendations related to their optimal use.

c. Physical Capacity Development (e.g., lab, field, equipment)

Not applicable

d. Human Capacity Development

a. Long-term training.

Name	Gender	Origin	Degree	Completion Date	Training Location	Employment

Over the past 5 year funding period alone, our studies funded by the Peanut CRSP provided training for 7 graduate students in host countries and 8 additional undergraduate students. An additional 3 graduate students were supported in the US along with numerous undergraduates.

b. Workshops and Short-Term training

Training Location	Training Type	Participants-Name or Number	Gender	Origin	Training Dates

Not applicable

e. Publications (just 2008-2013)

Manuscripts under review or in preparation

Jones JB, Provost M, Keaver L, Breen C, Ludy MJ, Mattes RD. A randomized trial on the effects of flavorings on the health benefits of daily peanut consumption. Am J Clin Nutr (submitted).

Moreira APB, Texeira TFS, Alves RDM, Peluzio MCG, Costa NMB, Bressan J, de Oliveira LL, Mattes RD, Alfenas RCG. A high-fat meal containing conventional or high-oleic peanuts is associated with delayed triglyceridaemia and lower 3h postprandial lipopolysaccharide levels in overweight/obese men. Br J Nutr (submitted)

Jones J, MattesRD, Kearney P. Peanuts. Encyclopedia of Foodand Health (Caballero B, Finglas P, Toldra F (Eds). Oxford: Elsevier, Ltd. (in preparation)

Alves RDM, Moreira APB, Macedo VS, Alfenas RCG, Bressan J; Mattes RD; Costa NMB. Regular intake of high-oleic peanuts increases fasting fat oxidation and improves body composition in overweight and obese men. (in prepartion).

Refereed Journal Articles

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Reis CEG, Ribeiro DN, Costa NMB, Bressan J, Alfenas RCG, Mattes RD. Acute and second meal effects of peanuts on glycemic response and appetite in obese women with high type 2 diabetes risk: a randomized crossover clinical trial. Br J Nutr 2012;5:1-9 PMID:23122211.

Devitt AA, Kuevi A, Coelho SB, Lokko P, Lartey A, Costa NMB, Bressan J, Mattes RD. Appetitive and dietary effects of consuming an energy-dense food (peanuts) with or between meals by snackers and non-snackers. J Nutr and Metab 2011, Article ID 928352 PMID: 21808728(doi:10.1155/2011/928352)

McKiernan F, Lokko P, Kuevi A, Sales RL, Costa NMB, Bressan J, Alfenas RCG, Mattes RD. Effects of peanut processing on body weight and fasting plasma lipids. Br J Nutr 2010;104(3):418-26 (PMID 20456815).

Mattes RD, Dreher ML. Nuts and healthy body weight maintenance mechanisms. Asia Pac J Clin Nutr 2010;19:137-141. (PMID: 20199999)

McKiernan F, Mattes RD. Effects of peanut processing on masticatory performance during variable appetitive states. J Nutr Metab 2010; article ID 487301. doi:10.1155/2010/487301. (PMID: 20721359)

Traoret CJ, Lokko P, Cruz ACRF, Oliveira CG, Costa NMB, Bressan J, Alfenas RCG, Mattes RD. Peanut digestion and energy balance. Int'l J Obes 2008;32(2):322-8. (PMID 17912269)

Sales RL, Coelho SB, Costa NMB, Bressan J, Iyer S, Boateng LA, Lokko P, Mattes RD. The effects of peanut oil on lipid profile of normolipidemic adults: A three-country collaborative study. J Appl Res 2008;8:216-225.

Mattes RD, Kris-Etherton PM, Foster GD. Impact of peanuts and tree nuts on body weight and health weight loss. J Nutr 2008;138:1741S-1745S.

Mattes RD. The energetics of nut consumption. Asia Pac J Clin Nutr 2008;17:337-339.

Book Chapters:

Jones JB, Lee J, Mattes RD. Solid versus liquid calories: Current scientific understandings. In Rippe JM (ed) Fructose, High Fructose Corn Syrup, Sucrose and health. Springer: NY (in press).

Tucker-Falconer, R, Mattes RD. Satiation, satiety: the puzzle of solids and liquids. In: Blundell J, Bellisle F. (eds), Satiation, satiety and the control of food intake. Woodhead Publishing Series in Food Science, Technology and Nutrition No 257: Cambridge, UK. 2013.

Mattes R, Tan S-Z. Snacking and energy balance in humans. In: Coulston A, Boushey C, Ferruzzi M. Nutrition in the Prevention and Treatment of Disease. Elsevier, San Diego, CA. 2013.

Mattes RD. Dietary approaches to exploit energy balance utilities for body weight management. In: Nutrition in the Prevention and Treatment of Disease 2nd Ed, (Coulston AM, Boushey CJ eds.). Elsevier: San Diego, CA, 2008, Pp. 457-467.

Abstracts and Proceedings

Do not have a record of abstracts.

2. Final Interpretation
a. Importance of Technical Achievements

Not applicable

b. Importance of Physical and Human Capacity Achievements

We have trained many students in the methods of human clinical research. We hope they will use their skills to further understanding of the health effects of peanut consumption.

c. Heritage left from workshops and short-term training

We did not hold workshops or training sessions

d. Heritage left in Publications

I believe we have published more on the health effects of peanut consumption than any other group. We have explored the mechanisms underlying the observation that regular peanut consumption does not promote weight gain. We have also documented health benefits of peanut consumption with respect to cardiovascular disease and diabetes risk as well as effects on blood pressure and inflammation. The publications describing our findings have laid the groundwork for public health recommendations to encourage peanut consumption. This will not only have an impact on health, but also agriculture since an increase in consumption should stimulate demand and growth of peanut agriculture.

3. Final Summary of Accomplishments by Objective

Objective 1

Document the effects of peanuts on gut satiety peptide release, reward system activity (hedonics) and GI transit.

We completed work on this objective and published our findings

Objective 2

Determine compliance with a recommendation for chronic inclusion of single versus varied forms (i.e., sensory properties) of peanuts in the diet among individuals with different characteristics (e.g., flavor preferences, cognitive restrained, variety seeking).

We completed work on this objective and a manuscript describing our findings was sent to the American Journal of Clinical Nutrition. We have addressed the reviewer's comments and re-submitted. We expect the work will be published shortly

Objective 3

Train investigators in human clinical research methods.

We have included students in all clinical trials, both in the US and host countries. Many have now been trained in the methods of human clinical research and they are prepared to contribute to further study of the health effects of peanut consumption.

Objective 4

A new clinical trial is planned for this year in Brazil . The goal is to assess the effect of daily peanut (commercial unpeeled and peeled peanuts) consumption (8 weeks) on: intestinal permeability, gut microbiota, inflammatory and oxidative biomarkers.

We completed work on this objective and a manuscript describing our findings was sent to the British Journal of Nutrition. We are waiting for editorial comments.

In summary, we fully met all of the stated objectives.