



# communicating Food for Health

## Dietary Phosphate Linked to Hypertension and CVD

Last year we published an article in which I suggested that added dietary phosphates appear to be displacing trans fat as the next dietary "bad boy." Like salt, retinol, and many other nutrients, there is a growing concern that an excessive dietary intake of phosphates promotes a wide variety of metabolic disturbances. Phosphate-rich foods promote vascular calcification by increasing Fibroblast Growth Factor 23 (FGF23). More recent studies have shown that increased FGF23 from a high-phosphate diet impairs renal excretion of excess calcium and sodium, promoting both increased blood pressure and artery calcification. These studies appeared in the January 2014 issue of [EMBO Molecular Medicine](#) (1).

Phosphate-rich foods include cheeses, meats, eggs, milk, colas, baking powders, and a growing number of processed foods. Phosphates are now widely used in the food industry as preservatives and pH stabilizers. When excessive phosphates are consumed, this stimulates the bones to release more FGF23. People with reduced kidney function are

at greater risk of this increased FGF23 in response to excessive dietary phosphate. Over 500 million people around the world now suffer from chronic kidney disease (CKD). Clinical studies have shown that CKD patients frequently see both rising blood pressure and increased vascular calcification, putting them at a much greater risk of CVD events. Increased FGF23 also plays an important role in undermining the kidneys' ability to get rid of excess sodium/salt. Mice that are genetically lacking FGF23 excrete higher amounts of sodium in their urine, resulting in lower blood pressure and resistance to CVD. By contrast, mice with higher FGF23 levels have been shown to have modestly higher levels of sodium in their blood and this likely contributes to both the development of high blood pressure (BP) and artery calcification.

Another study by Dr. Erben's group, published in the same issue, showed that FGF23 also helps control serum calcium levels. The elevated FGF23 causes the kidneys to retain both excessive sodium and calcium in the blood. Olena Andrukhova, the

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July '14

*Professional Member Edition*

### Research

Dietary phosphate has been linked to hypertension and CVD.

### Practitioner Tips

Help clients sidestep excess calories at buffet restaurants.

*Client and Consumer Education*

### Handouts: Recipes and Cooking Tips

1. Grilled Sicilian Eggplant Rolls
2. French Herb Salad

### This Month's Handouts

1. Mediterranean Diet Profile
2. Fad or Fact? [Grain Brain](#) Book Review
3. Exploring a European Diet
4. Balancing Diet & Exercise

*Online: Clipart, Calendar, Recipes, PDF Handouts, Articles, This Month, Newsletter Archive*

## *The commercial food industry has doubled the amount of phosphates added to processed foods in just the last 15-20 years.*

lead author of this second study stated: "Patients with CKD often also suffer from cardiovascular disease. Raised FGF23 levels are partly responsible for this. Our results for the first time are able to explain this connection."

The hormone FGF23 is formed in the bones and controls the excretion of phosphate via the kidneys. When there is too much phosphate present in the body, the FGF23 level rises, which then promotes the excretion of this excess phosphate. If too much phosphate is ingested with food, or if the excretion process via the kidneys does not work correctly, phosphate and FGF23 levels both increase. This results in a deadly spiral of metabolic disturbances that can not only speed up renal failure but also lead to more rapid loss of bone calcium, increased calcification of arteries, elevated BP, and a markedly increased risk of CVD. Dr. Erben and colleagues showed for the first time that FGF23 can be responsible for excessive calcium and sodium retention. An increased level of FGF23 in kidney patients reduces their life expectancy. A diet high in phosphate will also elevate FGF23 in people with normal kidney function.

An increased acid load (particularly from high-phosphate foods) may promote metabolic

changes that, over time, contribute to the development of osteoporosis, kidney stones, loss of kidney function, type 2 DM, HTN, CVD, and possibly some types of cancer (2).

Unfortunately, the commercial food industry has roughly doubled the amount of phosphates added to processed foods in just the last 15-20 years. It is known that CVD events and mortality both increase as the estimated glomerular filtration rate (eGFR) goes below 60 ml/min. In dialysis patients who have lost nearly all renal function, CVD is increased 10- to 20-fold compared to that of the general population. This represents the majority of the high 15-25% per year mortality rate seen in patients on dialysis (3).

Diets high in phosphates not only elevate FGF23 but also reduce renal production of 1,25 di-OH-D (the metabolically-active form of vitamin D). People with elevated FGF23 who take high doses of vitamin D and calcium often find that much of that extra calcium ends up in their arteries rather than in their bones, which is why failing kidney patients often suffer from both osteoporosis/osteomalacia and much more CVD. Reducing the dietary acid load — especially from phosphates — has been shown to improve insulin function and slow the progression of CKD (4). Normal aging

increases the loss of renal function but renal function makes excessive dietary intake of phosphates and salt more dangerous in an aging population.

**Bottom Line:** The American food industry continues to add excessive amounts of salt and phosphates to a wide variety of food products. More and more evidence demonstrates that this leads to excessive phosphate intake, which poses a threat to public health.

*By James J. Kenney, PhD,  
FACN*

### **Sources:**

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2. MS Razzaque. Phosphate toxicity: new insights into an old problem. Clin Sci. 2011;120:91-7.
3. Sarnak MJ, Coronado BE, Greene T et al. Cardiovascular disease risk factors in chronic renal insufficiency. Clin Nephrol 2002; 57: 327-3356.
4. H. Gin, et al. Am J Clin Nutr 1994;59:663-6 & N. Goraya, et al. Kidney Int 2012;81:86-93.

## Battle the Buffet: Tales from the Trenches

A large chain all-you-can-eat buffet opened a couple years ago in our community. Since this is a small town with limited restaurant choices, it has become very popular. It also has a meeting room for local clubs and groups. Sometimes “not going there” is not an option.

So the challenge... can you go to a buffet and not overdo it?

Here are a few suggestions from members of my weight loss and healthful eating class:

- Check it all out first and decide what you really want. Decide which calories are “worth it.”
- Start with the salad and fresh vegetable section — fill a plate with these. Watch the dressing.

- Look for fruit — canned peaches and fruit cocktail in syrup doesn’t count.
- Look for grilled or steamed items.
- Skip things with sauces, high fat cheeses, and gravy.

These are all great suggestions, and I’d like to add a few of my own...

- It’s OK to take just a little. Sit down. Eat slowly. Then get a clean plate and get something else.
- Remember MyPlate. Every time you get something, fill at least half your plate with fruits and vegetables.
- If you want dessert, go for just one item. Select the one you really want, don’t nibble on several.
- Chocolate fountains may actually be a blessing. These fountains usually offer fruit and angel food cake as dippers — both good choices — even with a little chocolate.

Members of my class are very assertive. They told the manager when they weren’t satisfied with the choices. If your clients aren’t finding appropriate choices, have them tell the management or fill out any evaluations. They’re probably not the only ones who are having trouble.

*By Cheryle Jones Syracuse, MS, Professor Emeritus, The Ohio State University*

## Display and Activity Ideas for Battling the Buffet

Post these ideas, along with pictures of healthful foods and reasonable portions, on a bulletin board.

Brainstorm other ways to make healthful choices at buffets. Discuss possible pitfalls and how to avoid them. Post the list somewhere visible or send it out as an email blast to all your participants.

### Communicating Food for Health

By Food and Health Communications, Inc.  
ISSN 1070-1613 © 2013. All rights reserved.  
P.O. Box 271108, Louisville, CO 80027  
Phone: 800-462-2352 Fax: 800-433-7435  
<http://communicatingfoodforhealth.com>

#### Executive Editor

Judy Doherty, PC II

#### Contributing Writers

James J. Kenney, PhD, FACN  
Jill Weisenberger, MS, RD, CDE  
Victoria Shanta Retelny, RD, LD  
Lynn Grieger, RD, CDE, CPT  
Stephanie Ronco

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P.O. Box 271108, Louisville, CO 80027;

Phone: 800-462-2352; Fax: 800-433-7435; [orders@foodand-health.com](mailto:orders@foodand-health.com)

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