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Happy bugs for healthy bones

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*Think there is **absolutely no way** you could possibly enjoy sauerkraut? That's probably because you've never had a freshly baked chicken thigh (page 229 in* Good Food, Great Medicine*, 4th edition) with a side of homemade sauerkraut. But it's not too late! Read on for our recipe.*

Bones, food, and our microbiome

- Does our microbiome have a role in preventing fractures?
- Should we take supplements that claim to build strong bones?
- What are some ways to incorporate probiotic foods into our meals?

We're glad you asked. The friendly microorganisms in our gastrointestinal tract, our microbiome, not only may be the most overlooked foot soldiers of our immune system, but there are increasing hints that these microorganisms in our gut are associated with bone health. The microbiome has a wide variety of roles in improving metabolic health, and it's not surprising to find there are positive associations between consumption of dairy foods with active cultures for bone health compared to unfermented dairy foods.[1]

The care and feeding of our microbiome

A healthy microbiome influences almost every aspect of health, including immunity, inflammation, cancer risk, obesity, blood sugar control, calcium absorption, cholesterol levels, and mental health, so it makes a lot of sense to feed and care for those hard-working bugs that populate the microbiome. There are three main lifestyle choices that encourage a robust microbiome:

1. Eat whole, unprocessed food

Practically speaking, this means eating meals you prepare yourself using ingredients with as few layers of processing between the original plant or animal and your plate as possible. It can mean food that is raw, frozen, fresh, canned, dried, or processed using traditional methods such as culturing and fermentation (to make yogurt, sauerkraut, and cheese, for example) which are minimal forms of processing and actually *enhance* the nutrition and probiotic content of foods. On the other hand, processing methods used by the food industry reduce or even remove nutrients while providing empty calories. (For a comprehensive discussion on whole foods and practical information on transitioning to them, see pages 35–50 in *Good Food, Great Medicine,* 4th edition.)

2. Be proactive with probiotics

Of course, the probiotic family includes usual suspects like unsweetened yogurt and kefir (read ingredient lists!) and traditional ferments like sauerkraut and kimchee, but *all unprocessed whole foods* – raw fruit, vegetables, grains, beans, lentils, nuts, seeds, and so on – are rich in microorganisms that are naturally probiotic. (See page 49 for more on probiotic whole foods.)

3. Get regular exercise

We can hardly take this seriously enough. Most of us find daily exercise more challenging than eating well, but it's true that "sitting is the new smoking". We don't need gym memberships, personal trainers, fancy equipment, or watches that monitor our heart rate. If we can't manage the RDA (15–60 minutes of moderate activity daily), we can at least commit to one minute of exercise three times a day. Try it for one week – you may be surprised where it leads. (See *Let's Move More!* on pages 70–74.)

What about supplements?

Magnesium, phosphorus, iron, phytoestrogens, omega-3 fatty acids and other trace elements are all important for bone health, and are generally well supplied in a whole food omnivorous diet like the Mediterranean. Before taking any supplement, identify sources pro and con and decide which arguments are the strongest – and almost always choose whole food sources over supplements. Calcium and vitamin D are more complicated subjects; see *Less Osteoporosis* on pages 27–28, and our new *Osteoporosis & Bone Health* guide at Greatmed.org.

[1] (Rizzoli, R., et al. (2021). Nutritional intake and bone health. The lancet. Diabetes & endocrinology, 9(9), 606–621. https://doi.org/10.1016/S2213-8587(21)00119-4)

Here are the before and after photos of our homemade sauerkraut: the jar on the left has just been filled with the salted fresh cabbage, and on the right is the same cabbage after it has been packed down firmly. Time will do the rest of the work!

Simple Sauerkraut

If you aren't making your own sauerkraut, you're passing up one of the vegetable world's most valuable gifts to busy people. Cabbage + salt + time = sauerkraut. The only work involved is slicing a cabbage, and a tool called a mandolin makes the job almost effortless. Salt coaxes the juice out of the cabbage to make the brine, after which an eager team of skilled microorganisms go to work to bump up the probiotic activity.

(Makes about 8 cups)

1 cabbage (about 2 lbs or 14 cups shredded), green/red/or combination of both
1 tablespoon salt (I use Kosher)

(Clear ½-gallon jar with wide mouth and lid)

1. Slice cabbage in quarters through core, and then into ⅛ to ¼-inch slices. (I use a mandolin for this, and leave in the core for a better grip. Watch your knuckles!) For a 2-pound cabbage you'll end up with *about* 14 cups of sliced. (Discard core and save an outer leaf or two to use in Step 4.)
2. Place in a large bowl and sprinkle with salt. Mix salt thoroughly through cabbage and then leave it alone for at least 30 minutes. (This gives the salt a head start in drawing the juice out of the sliced cabbage, and will make the next step much easier and faster.)
3. The next step is to knead the cabbage (by hand or with a silicone spatula) for a few minutes, or until it's reduced by about half and has released the extra brine you need. Transfer cabbage by hand or with tongs into a jar with a wide mouth, such as a half-gallon Mason jar. After every few handfuls, press the cabbage down firmly – your fist works well. You want it tightly packed, with about a ½-inch layer of brine on top; this seals off the cabbage and prevents mold and anything else from interrupting a healthy ferment. I have never had a problem, but. . . (See note below.)
4. Place a leaf or two of cabbage, folded to roughly fit the inside diameter of the jar, on top of the shredded cabbage, press down to submerge it in brine, and place something heavy on top to keep it submerged. (I use a half-pint mason jar half filled with water, placing it on the cabbage "lid" and pressing it down until all is submerged again.)
5. Place a lid or cover on the jar, and store at room temperature (a cool rather than warm spot) out of direct light. Check it every day to make sure there is a half-inch or so of brine on top; if not, push the bottle/weight down to encourage the cabbage to stay below the surface.
6. The sauerkraut is ready to eat in 1–2 weeks; I like it to taste mild enough to eat as I would a salad rather than a condiment. (For more traditional sauerkraut, ferment for 3–4 weeks and then taste to see if it suits you.) Keeps up to 12 months in the refrigerator.

Note:

- Even if you are happy with my simple recipe using the most basic method, there is not enough space here to cover a fraction of the variations, information, advice, and opinions attached to a traditional food like this. Take time to visit sauerkraut-friendly websites like makesauerkraut.com/fermentation-tips-tricks.
- Cabbages can vary enormously in weight and density. For a larger or smaller batch than the recipe here, remember to maintain the salt/cabbage ratio.

"Prove all things; hold fast that which is good."
1 Thessalonians 5:21 (KJV)