In the past decade, the list of cancers clearly associated with obesity or excessive weight has grown: breast, kidney, uterine, pancreatic, colorectal, and esophageal cancers. Dr. Irwin said, “Some know a bit about both, and some know a lot about one type but not much about the other. Some know a lot about cancer but not much about obesity. Some know a bit about both, and some know a lot about one type of cancer associated with obesity but not much about another type associated with it.”

Fostering collaborations is one of the group’s goals, and response to the idea has been strong. More than 100 faculty across Yale have joined the group, which met twice this spring, and is scheduled to gather again this fall. Dr. Irwin expects to settle into this year by starting the Obesity and Cancer Working Group. Dr. Johnson is an analytical chemist. They are applying their dual expertise to data from the Lifestyle, Exercise, and Nutrition (LEAN) trial in which Dr. Irwin followed two groups of overweight breast cancer survivors after they completed their breast cancer treatment, half of the survivors were randomized to a weight loss program of exercise and improved diet for six months. The study looked for changes in weight as well as biomarkers associated with better or worse outcomes in breast cancer survivors. The women who lost weight had improvements in inflammation-related biomarkers, in particular, C-reactive protein.

Drs. Ferrucci and Johnson are using stool and serum samples from both groups of women to compare changes in the metabolome and microbiome. “Metabolites and the microbiome work together to modulate your health, and a large number of metabolites are co-produced by actions of the microbiome,” explained Dr. Johnson. “When something aberrant happens, whether it’s a genetic mutation, environmental exposure or other stressor, it can change the balance of both your metabolites and microbiome, which can lead to cancer.”

Using the serum samples, Dr. Johnson did a metabolite analysis of the thousands of metabolic changes possible in both groups of women over the study’s six months. The preliminary data show that exercise and diet altered the metabolites in the women who received the weight loss intervention. Next, Dr. Johnson will look for the metabolites that most distinguish the diet- and exercise group from the control group, since those could be useful biomarkers.

“Metabolites are a fast and potentially more objective way of getting information about what someone is eating compared to our typical method of having people self-report their diet,” Dr. Ferrucci explained. “You can look for metabolites in the blood or stool, and they give you information not only about the person’s dietary and other lifestyle exposures, but also about how the body is processing those exposures.”

They analyzed the LEAN stool samples, and found differences between the intervention group and the control group in terms of short-chain fatty acids. “That makes sense,” she said, “because we asked the intervention group to decrease calories, to eat more fruits and vegetables, less whole grains, less meat and fats. In this small pilot study, there was an indication of a greater accumulation of potentially beneficial short-chain fatty acids in the intervention group compared to the control group.” These have been linked to decreased incidence of colorectal cancer, in particular, which is Dr. Johnson’s main research focus.

She and Dr. Ferrucci presented their preliminary findings to the Obesity and Cancer Working Group in June, and received helpful feedback about possible ways to proceed. That’s one of the group’s purposes. “You may be able to find a logical collaborator who is very close by, but you wouldn’t even realize it if you were just in your office doing your own work,” said Dr. Ferrucci.