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Diet and Cancer

OpenSource Diets-Creating a Clean Background for Oncology Research

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Laboratory animal models are important tools in oncology research, as they allow scientists to test their in vitro-generated hypotheses in a mammalian, whole-animal system. Since many types of cancer can be affected by environmental factors, having control over these factors is key to generating reproducible, meaningful data.

Research Diets products are routinely used for oncology research. OpenSource diets contain purified ingredients provide a clean background (i.e. phytoestrogen and cholorphyll-free) to reduce 'noise' during in vivo imaging, and easily control for factors that may impact gene expression.

Effects of Phytoestrogens in Grain-based Diets on Cancer and Related Endpoints

Grain-based chow diets contain ingredients possessing biologically active compounds that can alter the cancer phenotype. One class of compounds called phytoestrogens, which are found in soybean meal and alfalfa, have all been shown to impact cancer endpoints (5, 6) and the concentration of these compounds in chow can have meaningful biological effects on cancer and other phenotypes (1, 10). Since the level of these compounds can vary from one lot to the next by as much as 3 – 6 fold (10) (FIG.1), it is possible that they can mask the influence of experimental compounds.

Genistein is a soy-based phytoestrogen that is commonly found in grain-based chow diets, and its influence on cancer is thought to be mediated by its ability to bind estrogen receptors (3, 7). Its potential impact on cancer (i.e. carcinogenic or anticarcinogenic) is related to factors including the dose, age, mode of cancer induction, and rodent model being studied (7). For example, one study suggested that exposure to genistein early in life (i.e. gestational and lactational phases) dose-dependently reduced tumor formation in a carcinogen-induced mammary cancer rat model (11). In contrast, another study showed that dietary genistein dose-dependently increased mammary tumor area in an estrogen-sensitive ovariectomized mouse model.

Effects on Gene Expression

In addition, effects of varying levels of phytoestrogens and other substances in chow (i.e. arsenic), can impact the phenotype at the gene level, (2, 4, 9), which can compromise the process of determining the mechanism by which various treatments or genetic mutations influence gene expression. Furthermore, the potential for unknown compounds in grains used in chows may have further impact on phenotype, which may translate to the gene level.

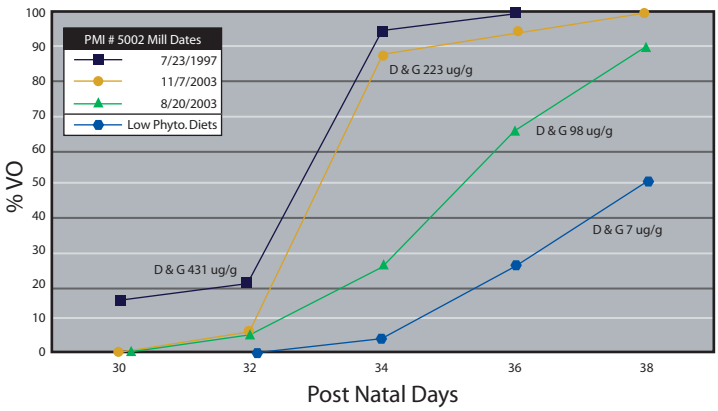
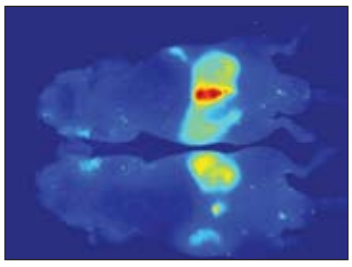


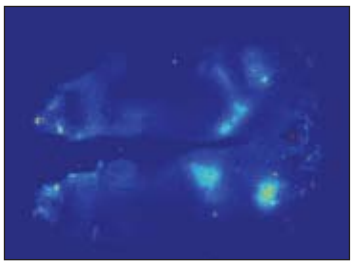
FIGURE 1. Batch-to-batch variation in total daidzein (D) and genistein (G) content versus vaginal opening (VO) data in F344 rats fed different mill dates of Purina Mills, Inc. (PMI) # 5002 diet. The total D & G content can vary 3-fold in different mill dates producing significant ($p < 0.05$) differences in the time of VO between different mill dates at postnatal days 34 and 36. The low phytoestrogen diet in the chart is PMI #5K96, but similar results were seen with Harlan Sprague Dawley (HSD) 2014S and HSD 2016S. Graphic representation - for details see reference (10).

Effects on In Vivo Imaging

Finally, the presence of chlorophyll in ingredients of chows such as alfalfa can create background 'noise' in studies where imaging technology is used. Therefore, it is essential to use chlorophyll-free diets when such technology is used.



Mice fed a grain-based chow diet as seen through the CRi in vivo imaging system.



Mice fed OpenSource Diet # D10001 as seen through the CRi in vivo imaging system.

OpenSource Diets

OpenSource purified ingredient diets are a solution to these issues, as they do not contain phytoestrogens or chlorophyll. While the lack of these compounds makes purified diets important tools for oncology research, the very nature of OpenSource purified diets argues for their use in all lab animal research.

Resource CENTER

Contact our Resource Center for valuable insight from more than 25 years of product experience in the field of cancer. Let us formulate the diets to meet your specific study needs.

Custom OpenSource Diets

Research Diets, Inc has pioneered the formulation and production of phytoestrogen-free/chlorophyll-free diets in laboratory animals. Our scientists specialize in providing custom purified OpenSource diets. By carefully designing the diet formula to fit your protocol, you have complete control over small or large changes in diet composition. Plus you are able to report what your animals were fed, repeat the formula and revise diet composition as necessary.

Incorporate Test Compounds

Research Diets, Inc. will incorporate your test compound into pelleted diets for simple, safe dosing. Feeding test compounds eliminates dosing related stress to the animal, eliminates vehicle effects, and saves time and labor. Consult with one of our scientists on the formula, determine the dosage required and the diet will be produced and shipped in 5 to 7 business days.

Value Added Resource

The value of our products is in the scientific support we provide. Our Resource Center is staffed with Masters and Ph.D. level scientists with access to over 14,000 original formulas and a database of more than 3,800 journal articles. We welcome the opportunity to talk science with researchers throughout the world as we maintain our leadership role as the knowledge base for OpenSource Diet formulation.

BioDAQ Episodic Intake Monitor

BioDAQ E2 Episodic monitoring system measures the ad libitum food and water intake behavior of singly housed lab rats and mice at very high resolution in their home cage. Computer controlled electronics record food and water intake episodically by measuring the moment-to-moment, undisturbed intake behavior of the animals being studied. The animal's behavior defines the variable period for these intake measurements through their native behavior.

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