Use of OpenSource Diets and In Vivo Imaging

In order to produce high quality in vivo images using fluorescence imaging technologies, it is important to have as low background signal as possible. It has been shown that laboratory animal diets containing chlorophyll fluoresce at 680 nm, which can interfere with the imaging of many common in vivo fluorophores such as GFP or Alexafluor 650 and 680. The confounding fluorescent signal they produce as they pass through the gastrointestinal tract makes quantification of true signal difficult. It appears that unrefined chlorophyll-containing ingredients, particularly alfalfa, are responsible for this 'noise'.

Chow

The ingredients used to make lab animal chows contain both nutritive and non-nutritive components, both of which will vary with season and harvest location. Because of these differences over time, chow companies use what is sometimes called the "constant nutrition" method of formulation which entails altering the concentration of each ingredient to ensure constant macronutrient content from batch to batch. However, in changing the levels of alfalfa for example, the amounts of non-nutritive compounds which "ride along" with the alfalfa are also changed. These compounds can include heavy metals such as arsenic, compounds used in pesticides, and phytoestrogens.

Many of these compounds have been shown to have an effect at the molecular level of gene expression. Phytoestrogens have been shown to inhibit atherosclerosis, hypertension, obesity, and diabetes and the formation of some cancers. One is forced to acknowledge that some of the plant-based ingredients in chows contain biologically active compounds which can affect the phenotype of the animal and furthermore, the levels of these compounds will likely vary from batch to batch.

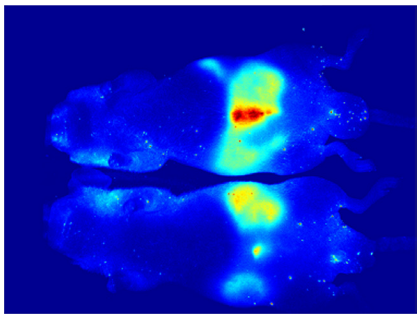
OpenSource Diets

Purified ingredient, OpenSource Diets are formulated and manufactured using very highly refined, chlorophyll-free ingredients. While the lack of chlorophyll in OpenSource diets provides convincing evidence for their use for in vivo imaging studies, the very nature of OpenSource purified diets argues for their use in all lab animal research.

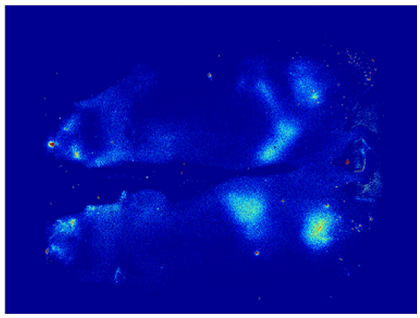
The highly refined ingredients used in OpenSource diets mean minimal batch-to-batch variation, reducing data variability due to diet. Secondly, the fact that each ingredient contains one nutrient makes it relatively simple to change the nutrient content of a diet to meet the needs of the researcher. Lastly, the known nutritional content and lack of variability in OpenSource purified diets means that researchers around the world can reliably report and repeat their studies.

Study-specific OpenSource Diets can be formulated in consultation with scientists in the Research Diets Resource Center. By using data from the scientific literature and our own 35 years of experience in this industry, we can provide researchers with information they need to decide which diets may be the most appropriate for their study.

Contact our Resource Center at info@researchdiets.com to discuss your OpenSource Diet needs.



Mice fed a grain-based chow diet as seen through the CRi Maestro *in vivo* imaging system.[2]



Mice fed OpenSource Diet # D10001 as seen (x10) through the CRi Maestro *in vivo* imaging system.[2]

The Maestro™ *in vivo* imaging system is an LCTF-based multispectral imaging which can capture reflectance and fluorescence images of small animals at multiple wavelengths. Spectral analysis software can then "unmix" multiple signals, remove autofluorescence contributions and greatly increase sensitivity and quantitative accuracy.[1]

1) Richard M. Levenson and James R. Mansfield, "Spectral Imaging in Biology and Medicine: Slices of Life" Cytometry A. 2006 Aug; 69(8):748-58.

2) Matthew B. Bouchard, Sarah A. MacLaurin, Peter J. Dwyer, James Mansfield, Richard Levenson, and Thomas Krucker "Technical Considerations in Longitudinal Multispectral Small Animal Molecular Imaging" Journal of Biomedical Optics, in press.

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