What can public sector researchers do to facilitate the registration process?

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The transition from research to a marketable product through registration involves science, business, and law. Even within science, many opportunities are missed to assist in the regulatory process. The first thing is to become familiar with registration requirements which include the main areas of 1) Product Characterization and Manufacturing, 2) Toxicology or Health Effects and 3) Non-Target or Environmental Effects. Thinking about science in a regulatory framework involves seeing how the information that is collected through the course of research can be expanded or modified to capture important information pertinent to risk assessment. Risk assessment is a function of hazard (how toxic a substance is) and exposure (frequency, route and length to which some form of contact will occur).

All the applicable data requirements must be satisfied by research studies or data waivers. Toxicology studies can be expensive and take time to organize, conduct and interpret. Data requirements can also be satisfied if there is existing data in the public literature that directly relates to the data requirements. In addition, observational type research that is properly geared toward a data guideline can contribute to a waiver. Therefore the key is recognizing the opportunities for these types of observational studies and seeing how they could be coupled with journal literature relating to hazard or exposure to build a sound scientific argument or waiver.

Negative data(lack of an effect) is often not published. Within a scientists own research, one of the simplest habits to assist registration is to make sure that negative data is recorded and documented so that is available for submission. Simply going back to an old study and saying nothing happened to a plant or animal is not acceptable. It must be recorded at the time it is observed.

The potential routes of exposure and inherent toxicity of the product dictate which studies need to be conducted. For example if a product is to be used only on ornamental crops there is a better chance that acute oral studies may be waived because the treated crop is not eaten. Similarly if a product is restricted to greenhouse use, a number of the environmentally related non-target effects may be waived.

Many biochemicals or organisms may be naturally occurring and routinely found in foods or the environment. While toxicology studies that state actual LD_{50} values are best, acute oral data requirements may also be satisfied by virtue of the fact that the active ingredient is already found in commonly consumed foods. Simply the presence of the same active in foods is not enough. It needs to be related to exposure. By knowing the typical yields of a crop and consumption data the theoretical exposure can be calculated. This can be compared to the known consumption of and content of the active ingredient that is being

registered. The point should be to explain that the theoretical exposure does not constitute a major increase in exposure above that which man is already exposed to. Food scientists and pharmacologists could help in knowing if the active ingredient is also found in foods or medicines and if there are any toxicology studies on the active ingredient.

Dermatologists could help in designing waivers involving dermal toxicity. Many natural products can be found in skin creams, hand cleansers, mouthwash, toothpaste or cosmetics. A caustic substance might not need a dermal toxicity study because its already well documented to be a dermal irritant. Dermal exposure can also be mitigated by protective clothing or by the type of formulation and application equipment involved.

Throughout a research program it important to document the concentrations, lengths of exposure and degrees of exposure involved in routine laboratory and field studies. Although it reflects a limited pool of individuals, affidavits stating a lack of adverse effects from technicians handling the active ingredient can be used as part of the dermal and hypersensitivity justifications.

Avian studies include oral and pulmonary toxicity. Ornithologists may be able to help in their knowledge about birds. This is especially true when it comes to specific endangered bird species. For example if the pesticide is for a specific use that coincides with a particular time of year, the bird may be migratory and not expected to be present during application. Certain birds only live in aquatic environments so potential exposure could be reduced by restricting the label against application to aquatic environments. Birds may have specific diets such as only eating grains or not eating grains which can impact exposure. Sometimes regional geographical restrictions can also limit exposure. Similarly ecologists, ichthyologists and marine biologists should be consulted in regard to wild mammal, freshwater fish, aquatic invertebrates, and marine environments.

Non target insects are one of the more common studies that are actually conducted rather than waived. Within this area, toxicity to honeybees are the most common. Most states have apiculturists that can assist in setting up observational type studies. This would generally involve documenting bee mortality of bees over time that are foraging in crops sprayed with the active ingredient versus bees in a non treated area. These would be similar to actual bee mortality studies, but actual studies need to be conducted under Good Laboratory Practices which are not possible under most university settings. If preliminary bee mortality studies are performed prior to pre-registration meetings and clear results are available , there would be greater likelihood that the actual studies can be waived. Observational studies (non-GLP) are not likely to be accepted once a study request has been made. In all environmental related data requirements, observational studies may be useful while conducting actual toxicology studies prior to a preregistration meeting may be a waste of resources. The ability to waive bee toxicity studies can also be related to exposure and application timing. Applications of products to soil at planting or other applications that are clearly at times when there is no flowering and bees are not present can also reduce the need for actual studies. If the product is a plant extract, find out if the active ingredient is present in the flower nectar and pollen and if bees forage on the plant or other plants that have the same active ingredient.