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Review

The European Long-range Research Initiative (LRI): A decade of contributions to human health protection, exposure modelling and environmental integrity

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ABSTRACT

The European Long-range Research Initiative (LRI) was launched in 2000. The objective of this programme is to provide increased understanding of the potential impact of chemicals on human health and the environment. The aim has been to reduce uncertainty associated with innovation, and to promote evidence-based decision making. In pursuing these objectives the LRI has commissioned independent scientific research in institutions throughout Europe and beyond. The portfolio of research supported by the LRI has delivered significant contributions to risk assessment sciences. In addition, the LRI programme has benefited the broader scientific community. In this review article members of the Cefic European Scientific Advisory Panel (ESAP), the body charged with providing oversight of the LRI programme, illustrate some of those achievements by reference to specific areas of research (respiratory allergy, human biomonitoring, environment and wildlife), and also the contribution made to the development of European scientists through the annual LRI Award Programme.

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1. Introduction

The Long-range Research Initiative (LRI) was launched in the USA in 1996. The objective was then, and remains still, to address important issues and stakeholder concerns in a proactive way by commissioning independent scientific research.

The European LRI, sponsored by Cefic (the European Chemical Industry Council) began a little later in 2000. This programme seeks to increase understanding of the potential impact of chemicals on human health and the environment. The overall purpose of the LRI is to reduce uncertainty associated with innovation, and to strengthen decision-making based on sound scientific evidence. In addressing these objectives the focus is on commissioning independent scientific research that will provide the foundations for effective risk assessment and risk management. Once per year, in June, there is a call for proposals (Fig. 1). The evaluations are carried out by panels composed of managers of the

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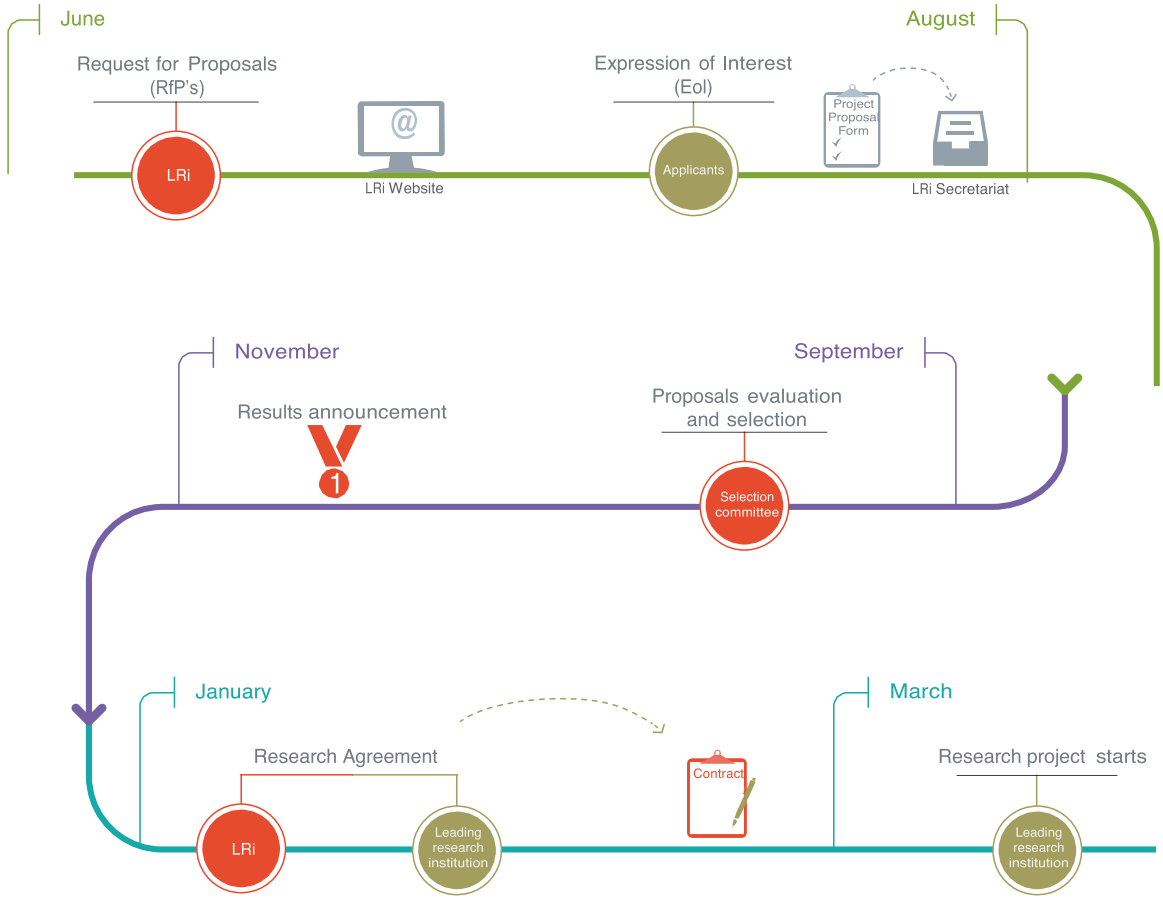

Fig. 1. Annual cycle of LRI project proposals.

chemical industry and scientific experts from independent organisations across Europe. Each year in November, a workshop is being held in Brussels, Belgium at which the project results are being presented and discussed.

In pursuing these aims the LRI has supported research by leading scientists and institutes throughout Europe and beyond. As well as providing the basis for improved risk assessment, the European LRI investment in research has yielded significant dividends to the wider scientific community. The purpose of this short article, authored by members of the Cefic European Scientific Advisory Panel (ESAP), is to highlight, in certain selected areas of research investment, the contribution the European LRI has made to the science of toxicology and environmental safety.

It is important to emphasise that this is not an exhaustive survey of research that has been supported by the European LRI; that programme of work is extensive and details are available elsewhere (Cefic LRI projects, http://www.cefic-lri.org/projects). The purpose is rather to highlight some of the research investments made by the LRI and their relevance to human health and environmental safety.

The selected areas summarised below are: chemical respiratory allergy, human biomonitoring, environmental integrity and wildlife protection and a survey of research in toxicology and environmental impact that has been recognised by the prestigious LRI Innovative Science Award programme. An overview of the projects discussed is given in Table 1.

2. Chemical respiratory allergy

Chemical allergy is an important environmental and occupational health problem, and can take a variety of forms. The most common form of chemical allergy, and the most frequent manifestation of immunotoxicity in humans, is skin sensitisation resulting in allergic contact dermatitis. Many hundreds of chemicals have been shown to cause skin sensitisation and the reactions they cause can sometimes be severe. However, there are tools in place (established *in vivo* tests, new *in vitro* methods and other emerging approaches) that provide the basis for hazard identification, hazard characterisation and risk assessment (Kimber et al., 2011; Basketter et al., 2013).

The picture is somewhat different with another form of chemical allergy that results from sensitisation of the respiratory tract. Chemicals that cause respiratory allergy are far fewer in number, the most commonly implicated being the diisocyanates, acid anhydrides and chloroplatinate salts. Sensitisation of the respiratory tract can result in occupational rhinitis and asthma, and reactions can be fatal (Baur, 2013; Kenyon et al., 2012).

The challenge for toxicologists is that there are currently in place no validated methods of any description for the identification and characterisation of chemicals that have the potential to cause allergic sensitisation of the respiratory tract. There has been for some time a pressing need for approaches that provide this information (Kimber et al., 2014a,b).