



LRI

stronger science for sound innovation



10 YEARS
LRI *The Long-range
Research Initiative*

a partner for policy-making

common ground for environment & health research

adding value where it matters



Public adoption and use of new technologies are an important determinant for their success in meeting societal challenges. The chemical industry not only provides solutions for challenges to modern society through its technology and products, but also takes responsibility for these: Cefic's Long-range Research Initiative (LRI) programme serves to increase understanding of the potential impact of chemicals on human health and the environment. The task of LRI is to reduce the uncertainty raised by innovation and to strengthen science-based decision-making.

LRI aims to provide proactive scientific advice on which the entire industry and regulatory bodies will draw to address societal concerns on a reliable basis.

As a fundamental basis for a sustainable chemical industry and a complement to Responsible Care, LRI needs to present a research programme that is forward-looking, ambitious but also realistic and coherent.

The current research areas are addressing key public concerns:

- **Development of intelligent testing**
(including alternatives to animal testing);
- **Understanding the effects of chemicals in complex environments;**
- **Public acceptance of new technologies.**

Providing an improved base for informed policy-making and an early warning of emerging issues, LRI also helps the industry in its own decision-making, especially during the innovation process, giving ground for companies to better understand the issues around the introduction of new products or technologies.

And, because industry cannot act alone, LRI is working in close collaboration with many players from various disciplines. Every effort is made to build relationships with top quality research programmes, government agencies, academics and non-governmental organisations for the sound management of chemicals for regulatory bodies and along the industrial value chain.

www.cefic-lri.org



LRI in numbers



- More than 10 years of environment & health research
- Over 120 projects, each with an average of 5 publications
- A network of more than 300 scientists
- A long-term collaboration with 50 universities and institutes across the globe
- Continued engagement with 20 national governments across Europe, North America and Asia
- 14 high-level scientific workshops with academia, NGOs and governments institutions all over the world
- 6 careers started through the LRI Award
- Global cooperation in three regions: Europe, USA, Japan through the International Council of Chemical Associations (ICCA)

a partner



for policy-making

REACH

The EU's chemicals legislation REACH requires testing of chemical substances to ensure their safety. Many of the LRI research projects allow data collection and testing to be done using fewer resources and also facilitate the sharing of data. Being able to accurately measure the concentration of chemicals in the environment is important for REACH compliance. This is a difficult process as the concentrations are affected depending on the environmental fate of the substance and how it is transported.

LRI has helped develop reliable, cost-effective tools and models to predict the behaviour and concentrations of chemicals in the environment.

Information is now more consistent and accessible as a result of centralised data and new resources developed through LRI.

**LRI projects are an asset in REACH implementation.
LRI helps REACH work.**

For the environment too, in the field of ecotoxicology, the potential hazard of a substance to different organisms has to be evaluated to understand any adverse ecological effects. Current methods extrapolate data to estimate the impact on a whole ecosystem but there is a level of uncertainty associated with this method. Scientists are working to increase confidence in ecotoxicity assessment methods and data by both improving the assessments for three main ecosystem types – inland aquatic, terrestrial and marine as well as developing in vitro toxicity testing methods which are less expensive and time-consuming.

LRI funds research which investigates alternative strategies for collecting reliable and representative ecotoxicity data.

Animal alternatives

There are mounting public and legislative concerns about the use of animals in testing and the need to provide alternatives. At the same time, testing requirements are increasing under the EU chemicals legislation (REACH). High expectations for alternative methods as well as societal, economical and ethical issues are all major factors in this major endeavour.

LRI has been successfully working for many years on finding alternatives to animal testing using the 3 R's principle (Replacement - Reduction - Refinement).

Cefic is a founding member and treasurer of the European Platform for Alternatives to Animal Testing (EPAA).

The alternative testing methods and modelling tools developed through LRI are designed to reduce regulatory compliance obstacles and reliance on animal testing.

LRI has also developed publicly accessible, methodical and transparent software to broaden the use of computational methods in chemical safety assessments, again reducing the need for animal testing.

PBTs

Evaluating if a substance is toxic, persists in the environment and bioaccumulates in the food chain – or not – is a priority for policy-makers.

These substances known as PBTs pose a risk to human health and the environment, as they are easily transported and accumulated in the environment.

LRI's work on data collection and modelling helps identify substances which are classed as PBTs and enables their appropriate risk assessment.

Bioaccumulation

Bioaccumulation is when substances build up in the body or in the environment through direct contact or food consumption. Biochemical reactions can then biotransform the substance into another one. Another transformation called biomagnification can result in larger concentrations of chemicals further up the food chain. LRI has funded research to improve our understanding of these issues in a way which results in minimal resource use and less animal testing.

Data sharing and cooperation between scientists are guiding principles of the LRI programme. The LRI research on bioaccumulation has created a gold standard for evaluating data and has resulted in more efficient chemical testing.



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Exposure

The effects of chemicals on human health and the environment depend on the level and type of exposure.

LRI's consumer exposure research has led to a better understanding of the factors which affect environmental exposure in people and boosted industry and policymakers' ability to monitor human exposure.

This work focussed on characterising substances' concentration in the environment, food and drinking water, determined how much of the substance is absorbed and for how long subjects may be exposed.

Exposure science is an important building block of toxicology research.

LRI's work on improving the accessibility and use of exposure assessment data supports chemical risk assessment and helps regulators set risk-based priorities. It also provides a solid framework for the comparison of international studies which is accepted worldwide. In addition to the research and database development, projects on developing biomarkers have been funded through LRI.

Cancer

Cancer is one of the biggest killers in our society today, taking more than seven million lives each year. More than 35% of these deaths are thought to be attributable to behavioural and environmental risk factors, including in part exposure to chemicals. Combatting cancer is a policy priority for governments worldwide as well as at the European Commission and World Health Organisation through their Environment and Health Action Plans.

LRI contributes to better understanding how chemicals can contribute to cancer through its work on chemical carcinogenesis – abnormal cell growth which often leads to cancer. LRI-funded research seeks to identify the changes which occur in cells after exposure to chemicals. These findings provide insights for developing knowledge-based risk assessments for carcinogenic and mutagenic substances.

LRI research supports the goals of the European environment & health strategy – and is relevant for society at large.

Endocrine disruption

As part of its commitment to better understanding the endocrine issue, LRI funded several research studies to refine and validate four assays included in the OECD's Endocrine Disrupter Testing and Assessment Programme.

LRI is also about joining forces and sharing expertise. In this instance, LRI worked with the OECD and national governments, sharing industry's knowledge to develop robust, validated and globally-harmonised test methods to manage the risks arising from the disruption of the endocrine system.

All of this scientific work means that science now has a major role to play in the debate on endocrine disruption. The adoption of globally-accepted screening methods means the international research community, assisted by LRI, can work together in an efficient and harmonised way, helping move the debate forward based on facts and science. LRI research has worked on bringing the different parts of the puzzle together.

Human biomonitoring

Body fluids and tissues have the capacity to accumulate both natural and man-made substances over time. Human biomonitoring (HBM) allows trace levels of such substances to be detected and is an important and evolving tool that provides useful information on human exposure to various environmental factors. The present focus on interpretation of HBM results in terms of health impact should contribute to HBM becoming an efficient early warning and policy implementation tool.

To go from simple identification of substances to understanding the causal relationships between the presence of certain chemicals and the health effects, a thorough exercise of interpretation is now required – and essential if efficient measures targeting public health improvement are to be put in place.

Through ICCA scientific projects and workshops, and in collaboration with academia and governments, LRI has invested in building up and sharing HBM data and health/disease trends that would allow for such interpretation. It is also closely involved in the development of new technologies such as genomics and toxicogenomics that will offer valuable information on the effects of chemicals at a molecular level, and a better understanding of their potential toxic effects.

Over the years, LRI has built strong partnerships with experts in the field. As a contributing partner in COPHES (Consortium to Perform Human Biomonitoring on a European Scale), the chemical industry works with 24 Member States on the harmonisation and interpretation of data, in order to develop a coherent approach to human biomonitoring in Europe.

Air quality

Air quality and the reduction of air pollution which contributes to asthma, allergies and other respiratory diseases is a political priority of both the European Commission and the WHO. LRI supports these objectives through research on environment and health interactions to better understand how exposure to lung irritants increase the incidence of allergic reactions and affect their severity and duration.

By contributing to the early identification of chemical allergens, LRI aims to advance work on preventing, diagnosing and treating respiratory health problems as well as developing a technique to improve risk assessment for air pollutants.

where it matters

Partnership

One of the major successes of the LRI programme over the last ten years has been to bring together a network of talented and committed researchers, academics, policy-makers and representatives of industry.

Through various events and activities, the LRI network has made significant advances in the field of environmental and human health as well as addressing issues such as societal acceptance of new technologies and innovation.

Working closely with the European Commission, OECD and WHO, LRI has long supported international policy objectives through its research.

In areas like human biomonitoring, endocrine disruption, animal testing and many more, LRI has contributed to both the scientific and the policy debate and is recognised by regulators as a reliable partner providing good quality, internationally-accepted science. Committed to filling knowledge gaps, LRI has moved into its next decade with the same dedication.

The LRI Annual Workshop is an opportunity for stakeholders to engage in dialogue, make a critical evaluation and constructive contribution to ensure the relevance and coherence of LRI.

On a number of key global issues, LRI's expertise is shared in Europe, USA and Japan to ensure best use of resources and global outreach.

LRI Innovative Science Award

The LRI Innovative Science Award is given annually to an early career researcher with a groundbreaking research project, either in toxicology, ecotoxicology or exposure science.

This annual €100,000 grant recognises outstanding contributions from young scientists and supports innovative research on the potential impact of chemicals, reflecting the industry's ambition to promote a stronger link between innovative science and society.

As cooperation between various disciplines and stakeholders is crucial, the Award shows the chemical industry's continued support to boost our understanding of the environment and health impact of chemicals. Besides, concrete, pragmatic proposals are needed to keep knowledge-based, scientific assessments as strong basis for decision-making.

The LRI Innovative Science Award is a contribution from the chemical industry towards creating a competitive and knowledge-based society in Europe – and past winners' projects clearly demonstrate this. Their vision and enthusiasm reaffirm the industry's belief that technology leadership and innovative solutions can help face many challenges of our society today and tomorrow.

For more information
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