

## **Prologue**

### **A brief reflection on the exposome**

*We live in complex times. Increasingly, our lives are being played out in cities with millions and millions of fellow inhabitants. We can travel practically anywhere in the world in 24 hours. Sitting at a computer, we can access all kinds of resources and with a simple click of the mouse order a limitless variety of goods and services, including the food that sustains us, sourced if we so wish from the other side of the globe. A plethora of devices makes our lives easier, enabling us to carry out numerous activities efficiently and safely. And when we run into a problem, we have developed highly diverse procedures and treatments that allow us, more often than not, to address it successfully.*

*From the moment we are born, we find ourselves inhabiting a complex environment, carefully created to ensure we are fed, kept warm, protected from infection and safeguarded against accidents. In this universe, one person cannot begin to comprehend how everything that sustains this environment works. We are oblivious to the price we pay for living a life that is, on the one hand, so easy, and on the other, so rich in possibilities. As this report is at pains to show, we are exposed to the action of a multitude of physical, chemical and biological agents that act as determinants of just how our lives will unfold. The complexity of the world and our incomprehension of how it functions compel us to develop concepts that allow us to understand and control, in the measure that this is possible, the factors to which we are exposed.*

*The exposome – as defined in this report – encompasses that set of factors to which an individual is exposed throughout their life and which has an impact on their health. And as the exposome expands, it becomes more and more evident that we cannot isolate ourselves from it and its diverse actions. Even factors produced thousands of kilometres from the place we live can end up impacting us. Indeed, the globality of the exposome leads us, in turn, to accept the globality of the health of human populations.*

*Understanding the exposome at any given moment should allow us to better plan a life that minimises its harmful effects. While we can sometimes mitigate these effects, our control is nevertheless limited. Modifying genetic factors, for example, lies largely beyond our current powers, as does that of many other factors. Additionally, the body's internal machinery has inherent flaws that contribute to the development of certain diseases. Life is also seldom free from random accidents. In essence, we are subject to both good and bad luck, and there is little we can do to change that.*

*Developing an awareness of all the factors that make up the exposome is today possible thanks to the powerful new tools of big data processing and, for this reason, it seems safe to say that the concept is here to stay. The Biological Sciences Section of the Institut d'Estudis Catalans accepted with great interest the proposal of the coordinators of this report, Josep Peñuelas and Josep Tabernero, since we believe it offers an authoritative and comprehensive perspective that relates the concepts of environmental analysis with the origins of human pathologies. It is our conviction that the approach adopted here will be one that we will turn to time and again in the future.*

PERE PUIGDOMÈNECH

*President of the Biological Sciences Section  
of the Institut d'Estudis Catalans*