

Context—A Subject More Important Than Ever



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It was supposed to take place in Delmenhorst (Germany) at the Hanse Wissenschaftskolleg (Institute for Advanced Study) in May (10–12) of 2021. Almost 40 scientists from around the world submitted proposals. Springer Publishers committed to a book supposed to be printed at the end of 2021 or spring of 2022. And then came Covid-19. The World Health Organization reported (in May of 2021) 5.5 million cases; almost 100,000 died as that time. It was only the beginning. As undesired as this pandemic was (and still is), it became a test of a number of various assumptions—including those related to in-person conferences. Leaving aside economic, social, political, racial, ethical, and other considerations—all of extreme significance—it is clear that science itself underwent a major experiment. Genetics played a spectacular role: millions of all kinds of sequencing operations were carried out. Epidemiology scored also high. Despite spectacular technical performance, and despite the heroic efforts of many practicing physicians, it is quite evident that science failed to prevent the disaster, not to say to properly address it. Of course, substantiating a value judgment as radical as the one I just articulated would take more than some introductory lines to this volume. (Actually, I dedicated a whole book to the subject). The pandemic became *volens-nolens* the opportunity to frame the subject of this publication: Anticipation and Epigenetics.

The crisis triggered by the SARS-CoV-2 virus evinced the significance of epigenetic inheritance. Covid-19 is the outcome of the processes through which epigenetic inheritance takes place. It is also the direct result of lack of prevention: that is, anticipatory actions that could have spared humankind the terrible consequences of the pandemic (by now the number of those who lost their life is close to 12 million). In other words, what had been the subject that the planned conference would have

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discussed in the comfort of academic debate became a reality. Moreover, given everything that the scientific community contributed in confronting the crisis, there is an urgency in providing not so much an analysis of the not yet settled past, but a perspective: What could the epigenetic consequences of the mRNA-based vaccines be? What are the implications of post-antiviral medication induced infections (i.e., treatments that in some cases lead to relapse)? More important, what is the connection between anticipatory actions expressed in the current research for vaccines and new therapies, and the long-term consequences of such actions?

Even the examination of this broad perspective does not yet define the context. Solid research, dating back to the end of the 1990s (cf. Petronis et al. 1997) focused on a specific condition—in which symptoms tend to become more severe, and appear at an earlier age. The question of whether this particular condition defined as anticipation is the consequence of genetic or epigenetic processes remained open. In some ways, a short communication such as the one mentioned, becomes part of what the conference, that could not take place as in-person event, would have been. Therefore, the text and the short position statement of 2 of the authors became part of this volume.

It is worth mentioning that the subject matter of epigenetics and of anticipation share in the rather difficult acceptance process through which the scientific community validates a new perspective. However, epigenetics fared so far better than anticipation, mostly because genetics—to which it was initially reduced—proved such a spectacular knowledge domain. This was not the case with anticipation—its history is less well defined, and its role in science remains a subject of debate. Therefore, the Study Group Anticipation Across Disciplines hosted by the Institute for Advances Studies, proved to be from its start of extreme significance to those trying to articulate a coherent perspective of the role of anticipatory processes. Indeed, with anticipation as a subject, several conferences took place, to which previous volumes were dedicated (*Anticipation and Medicine*, 2016; *Anticipation Across Disciplines*, 2015; *Learning from the Past. Early Soviet/Russian contributions to a science of anticipation*). It is in this concrete manner that a new horizon was defined and a foundation for scientific debate was made available. Let me quote from the application for funding submitted to the German Science Foundation:

The scientific objective of the workshop “Epigenetic and Anticipation” is to transform the awareness of the anticipatory perspective into actionable methods (for practitioners of medicine, but also for those who design new technologies, or who advocate sustainable alternatives). Solutions that are reactive in nature will not do. Anticipatory awareness means the realization that reductionism—focus on one aspect to the detriment of the larger understanding of reality—undermines our effort in addressing issues of ecology, health, scientific and technological progress. For example, a pharmaceutical company will try to develop a drug that will reverse an epigenetically expressed condition, such as cancers. The anticipatory approach will translate into being aware of factors that could have harmful epigenetic effects, and help avoiding them.

The proposal did not predict the pandemic, although it expressed ideas that became critical during the pandemic. It reiterated the fact that during its still formative

years, anticipation ascertained a perspective complementary to that of reductionist-determinism. It also took note of the fact that genetics is grounded in reductionist-determinism, while epigenetics suggests an alternative view, while still seeking the certitude of the experimental method. I was honored to be joined by Prof. Dr. Kerstin Schill, Rector of the Hanse Institute for Advanced Study and by Dr. Dorothe Poggel, in charge of the Brain-Mind program as co-PI's for the proposal.

What in the final analysis justifies the investment (in time, dedication, research effort, funding) in producing the repository of a conference that reality rendered impossible is the trust and dedication of everyone who remained on board. First and foremost, the Hanse Institute for Advanced Study (Hanse Wissenschaftskolleg/HWK). In particular, Dr. Reto Weiler and Dr. Dorothe Poggel never ceased to support the International Study Group in Anticipation Across Disciplines. The University of Texas at Dallas, by now a tier-1 institution, continued its support of the antÉ—Institute for Research in Anticipatory Systems for almost 18 years. This, as a virtual community of researchers, was able to address the foundation of a science of anticipation as well as applications ranging from motoric aspects of aging, brain plasticity, performance in critical contexts, creativity, etc. The Institute dedicated means to preparing this publication. When everyone was struck by the fears of the day—not to say directly affected by the pandemic—Springer Publishers, in particular Dr. Thomas Ditzinger, Editorial Director (Interdisciplinary Applied Sciences), understood that it takes longer to assemble a finalized set of papers during a pandemic than after a conference held under normal conditions. Without the support of everyone involved, this project would not have been brought to fruition. As Editor of this volume, I would like to express my gratitude to all the authors. The International Agency for Research on Cancer (IARC) of the World Health Organization announced, as we worked on this volume, that the inaugural recipient of the IARC Award for Women in Cancer Research is Dr. Cristina Stefan, Director of the Institute of Global Health Equity Research in Kigali, Rwanda. She is joined by a group of researchers from the University of Medicine in Cluj-Napoca in sharing insight into the relevance of epigenetics and anticipation in the treatment of cancer. Horst Horsthemke, active in the epigenetics community for a long time was exemplary in supporting the making of this book. Moshe Szyf, who, together with Michael Meaney is credited for having established the field of behavioral epigenetics, made an impressive effort to live up to a commitment made before the pandemic changed out lives. Actually, when the going gets tough—and tough it was—everyone who remains committed and never compromise integrity deserve recognition. Therefore, Dr. Asma Naz who gave the volume more than a formatting and Maryam Ashkaboosi, for many images, deserve no less than the scientists mentioned to be named for their contribution. May this volume lead to many discussions and follow-up research.