

## PREFACE

Expect the unexpected. This adage flawlessly embodies infectious diseases and pathogens. The causative agents of infectious diseases master the art of exploiting any shortcoming, any breach, any loophole in our defensive arsenal—sometimes in the most unanticipated of manner. They can resist our most dedicated control and eradication plans. They can defeat our most advanced antimicrobials, evade our best-trained immune system, and sabotage our most daring vaccine development efforts. Others can switch hosts and successfully use human beings to perpetuate themselves, even for just that one-time jump or zoonotic infection—those diseases transmitted between animals and humans.

And of course, they can trigger worldwide pandemics . . . or not . . . or not yet. The causative agents of infectious diseases master the art of defying our finest understanding of disease emergence and our most trusted predictions.

We have been scientifically aware of the existence of the microscopic causative agents of infectious diseases for about 140 years or six generations. In over a century, astounding progress has been achieved to decipher their (molecular) biology, their disease-causing pathogenesis, their epidemiology, their ecology, and their evolution. Revolutionary biotechnologies have allowed researchers to mine ever deeper the mysteries of their realm. But equally dumbfounding knowledge gaps remain.

*Fatal Jump: Tracking the Origins of Pandemics* is a journey, by leaps and bounds around the world and through time, to examine the extraordinary circumstances—evolutionary, ecological, and otherwise—that converged and gave birth to some of our most wicked and unexpected plagues and pandemics. The itinerary we will follow pieces

together the results of the latest science probing into the origin and rise of our microbial foes, building on the relentless work of a vast and diverse research community. This journey takes us to most surprising destinations, including a detour that brings us back to the origin of life, and reveals secret coves that we have yet to explore, secret doors that we have yet to crack open.

By immersing ourselves in some of the most tragic moments of humanity's story, and by tracing the ripple effects of these events through time, we can only be shaken by the long-lasting and unforeseen consequences that succeeded the coming into existence of humanity's new microbial foes, time and again. Beyond the traditional historical account of human infectious diseases, this book relates the fateful chains of events that catalyzed global health threats. It unveils commonalities and coincidences that, throughout the ages, consistently preceded or triggered the emergence of new infectious diseases or the flare-ups of old ones. The journey teaches us the responses and the solutions humanity must unfailingly apply to curb the rise of future plagues and pandemics.

Are you ready to meet the unexpected?