ons of selective pressure have shaped Earth's biological life, genetically optimizing organisms to survive varied environments and exposures. This selection may establish novel genetic variants in the genomes of a population or species, including humans. For example, genetic responses to diet and altitude helped humans adapt to new climes as they exited Africa and moved across the globe. Furthermore, the influence of environment can encompass the cellular level—for example, in shaping how cells in our immune system interact with both external and internal influences to maintain our health. Recent work shows that adaptation extends beyond changes in DNA sequences. The inheritance of environmentally influenced traits can also occur through epigenetic mechanisms. Although these mechanisms assist in adapting to new or shifting environments, some genetic and epigenetic changes may have resulted in modern pathology owing to recent and rapid changes in our diets, lifestyles, and exposures.

The challenge is to understand how we can mitigate harms caused by discordant responses to our surroundings. Understanding how human genetics and epigenetics respond to the multitude of external influences should help us prevent pathology and treat disease in ourselves and future generations.
A smoggy day in Qingdao, China. There is interest in the extent to which environmental pressures, such as pollution, may affect human genetic and epigenetic processes.
Genes under pressure
Laura M. Zahn and Beverly A. Purnell

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