Conservation medicine: synthesis or crisis discipline?


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Often, the application of a novel approach to a specific area of biology can provide new insights and understanding, leading, in some cases, to the emergence of a new discipline, such as behavioural ecology (using an evolutionary approach to study animal behaviour) or modern epidemiology (applying population dynamics to our biological understanding of parasitology). Conservation Medicine discusses what is perhaps another new discipline, but what exactly is conservation medicine? Is it really a synthesis or a crisis discipline, and will it stimulate exciting new questions and provide new insights?

The field of conservation medicine is already established, with a centre of excellence based at Wildlife Trust in New York called The Consortium for Conservation Medicine (http://www.conservationmedicine.org), which brings together five research units in the diseases of humans, domestic animals and wildlife to examine the multi-faceted approach needed to understand disease emergence and impact. So, is this the synthesis of medicine with conservation? Not really, although it is examining the ecological context of health by investigating the links between land-use changes and disease emergence (nine of 29 chapters), looking at how biodiversity (four chapters) influences the health of natural communities and humans (12 chapters). The term ‘health’ is a rather vague qualitative term describing the overall condition of a body; but, there again, medical and veterinary workers like to use it because it encapsulates both the nature of parasitism and the response of that host. Perhaps we can reach some quantitative understanding of health through this new approach. So, in this respect I like to think of conservation medicine as the consequence of the human footprint on the ecological balance of disease dynamics. Introduce a virus, such as West Nile Virus, into urban New York where there are abundant mosquito vectors and a naïve bird population and it rapidly becomes endemic, crossing the whole continent in just a few years and resulting in remedial action such as the draining of wetlands, the associated loss of biodiversity and consequences for biogeochemical cycling. It is these issues that are conservation medicine and that are examined in this book.

Conservation medicine is an exciting new field, particularly given the changes in disease prevalence that are associated with human behaviour. For example, in south-west USA, land-use changes, droughts and persecution of predators followed by heavy rains increased primary productivity and led to a tenfold increase in rodents, rapid transmission of the Hanta virus and exposure of humans to rodent feces, urine and, thus, to the disease. Rick Ostfeld captures the excitement of conservation medicine in his chapter when he considers the ecological context of Lyme disease emergence in north-east USA. Here, there is increasing evidence that biodiversity influences the risk of human infection with the causative agent, a tick borne spirochete. Anthropogenic impact on the environment invariably leads to a loss of biodiversity, the larger and the more sensitive mammals go first, whereas rodent species, such as the deer mouse, are some of the last to leave since they tolerate humans well. But the mouse is the competent host in the system and the other species were dead end hosts that acted as a sink for the spirochete population. As such, when we reduce biodiversity, we lose the buffering hosts and can expect to see an increase in Lyme disease prevalence.

The whole subject of disease emergence, evolutionary changes in pathogens, spatial spread of disease and the direct and indirect consequences for ecosystem functioning is a huge and pressing subject, particularly given the impact of humans on the spread of disease vectors, the diseases themselves, and the environment as a whole. To predict disease spread and emergence, we need to operate at the biological scales ranging from the molecular to the landscape, and we must work collaboratively with human and ecological health issues. Conservation Medicine provides a good entry into the subject and the enthusiasm and drive of its contributors highlight how inter-disciplinary research should be undertaken. Like any multi-author volume, there are high points and low points but it is the first volume that sets the scene for what must become an interdisciplinary subject.