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# Ecotrophism: Epidemiology, Evolution and Genetics of Primate Arthritis

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## Abstract

Ecotrophism describes environmental nitches and the organisms that fill them. The term trophism can be used to define a reaction to a stimulus (e.g., geotrophism or heliotrophism), but it can also be used to explain the pattern of that reaction (e.g, osseotrophism). The latter refers to the tendency of a given disease to affect some joints, while sparing others. The current review examines in non-human primates the epidemiology (phylogenetic distribution) and evolution (prevalence through time) of those forms of arthritis categorized as spondyloarthropathy.

Spondyloarthropathy is a trans-mammalian phenomenon, having been identified in as disparate animals as elephants, bears, rhinoceros, koala and porcupines. It also has a substantial representation in geologic time, present even in dinosaurs, with prevalence increasing up to 7-fold in mammals from the Oligocene (40 million years ago) to the present. Spondyloarthropathy appears to be a relatively new development in primates. Its presence in 20% of current gorillas contrasts with total absence in the Miocene ape *Proconsul*. Four percent of baboon collected in the wild in the 1920's and 1930's had the disease. This increased to 10% in the 1960's and 1970's, and to 30% in the 1980's. The frequency of spondyloarthropathy in rhesus macaques *Macaca mulatta* in the Cayo Santiago Colony established in 1938 was noted to be tribe dependent in the 1940's, with prevalence ranging from five to 20%. This equalized to 20% overall in the next 30 years. Contrasted with generalized affliction of Old World monkeys, spondyloarthropathy was found in only 4 genera of New World primates. The prevalence in apes ranges from 4% in the lesser ape *Hylobates* [4] to 17-28% in great apes. Subspecies of chimpanzees and gorillas had identical prevalence, but had different patterns of arthritis, in an environmentally-dependent pattern. Epitopes related to the "active center" of the human HLA-B27 gene related to this form of arthritis are present in Old World monkeys.

The most common joint pathology in free-ranging non-human primates is a disorder that seemingly has found its nitch. It is increasing in prevalence with special predilection for the great apes, perhaps establishing their susceptibility, with specific manifestations dependent on environmental exposures.

## Biography

Bruce M. Rothschild graduated from New Jersey College of Medicine in 1973. He is a Fellow of the American College of Physicians, American College of Rheumatology and Society of Skeletal Radiology and elected to the International Skeletal Society. He has been recognized for his work in Rheumatology and Skeletal Pathology where his special interests focus on clinical-anatomic-radiologic correlation, data-based paleopathology, evolution of inflammatory arthritis and tuberculosis and management of inflammatory arthritis. He is widely recognized for his contributions to understanding radiologic manifestations of rheumatologic disease.He has been a Visiting Professor at universities in the US, Canada, the Carribean, South America, Europe, the Middle East, South Africa, Asia and Australia and has been an invited lecturer at universities, hospital and museums throughout the world.