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The ‘Jekyll and Hyde’ personality of *Propionibacterium acnes* in relation to human health and disease

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Propionibacterium acnes is a Gram-positive anaerobic bacterium that is found predominately on the skin where it forms part of the resident microbiota. It represents the major opportunistic pathogen within the ‘cutaneous’ group of propionibacteria and has been linked, sometimes controversially, to a range of infections and conditions. Historically, the role of *P.acnes* in human disease has been underestimated due to the perception that the bacterium is a harmless member of the human microbiota, thus leading to its dismissal as a contaminant when isolated from clinical samples; inadequate laboratory protocols can also lead to poor diagnostic sensitivity for its detection. Within the last decade, data emerging from a large number of *P.acnes* whole genome sequencing projects, phylogenetic and genetic population analyses, and studies at the transcriptome and proteome level have challenged our traditional understanding of this bacterium, providing new insights into its intraspecies diversity and capacity to cause human disease. Major genetic divisions that differ in genome content, inflammatory potential, expression of putative virulence determinants and association with human disease, along with epidemic clones that are globally disseminated within the human population, have now been discovered. While *P.acnes* is well known for its association with the inflammatory skin condition acne vulgaris, after which it is named, its potential role in the aetiology of a number of other diseases is increasingly recognised, including the skin pigmentation disorder progressive macular hypomelanosis, medical implant-related infections, chronic back pain, prostate cancer and sarcoidosis. In the latter case, *P.acnes* may stimulate a hypersensitivity reaction in some individuals leading to granuloma formation. In this paper, we will discuss the growing importance of *P.acnes* in human health and disease, and consider how its emerging role in the aetiology of certain conditions may open up exciting new therapeutic strategies for their treatment.