Propionibacterium acnes: disease-causing agent or common contaminant? Detection in diverse patient samples by next generation sequencing

Propionibacterium acnes is the most abundant bacterium on human skin, particularly in sebaceous areas. P. acnes is suggested to be an opportunistic pathogen involved in the development of diverse medical conditions, but is also a proven contaminant of human samples and surgical wounds. Its significance as a pathogen is consequently a matter of debate.

In the present study we investigated the presence of P. acnes DNA in 250 next generation sequencing datasets generated from 180 samples of 20 different sample types, mostly of cancerous origin. The samples were either subjected to microbial enrichment, involving nuclease treatment to reduce the amount of host nucleic acids, or shotgun-sequenced. We detected high proportions of P. acnes in enriched samples, particularly skin derived and other tissue samples, with levels being higher in enriched compared to shotgun-sequenced samples. P. acnes reads were detected in most samples analysed, though the proportions in most shotgun-sequenced samples were low. Our results show that P. acnes can be detected in practically all sample types when employing molecular methods such as next generation sequencing. The possibility of contamination from the patient or other sources, including laboratory reagents or environment, should therefore always be considered carefully when P. acnes is detected in clinical samples. We advocate that detection of P. acnes is always accompanied by experiments validating the association between this bacterium and any clinical condition.