**Phage-dependent variability of *Candidatus* ‘Accumulibacter phosphatis’ populations in aerobic granular sludge**

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During the past 20 years, aerobic granular sludge (AGS) has been extensively studied with the aim to develop an attractive alternative to conventional activated sludge for wastewater treatment. The phosphate-accumulating organism (PAO) *Candidatus* ‘Accumulibacter phosphatis’ is often found with significant abundance in AGS as well as in other enhanced biological phosporus removal (EPBR) systems. Although they have never been isolated in pure culture, members of this bacterial genus appear to be genetically and physiologically more diversified than initially expected. Impaired EBPR performances observed in lab- and full-scale reactors have often been correlated to a decrease in *Accumulibacter* populations. This phenomenon has mainly been linked to the presence of bacterial competitors such as glycogen-accumulating organisms (GAO), and bacteriophages have only rarely been suspected to be responsible for this depletion (1).

In the present study, the metagenome of 46 individual granules from a lab-scale AGS sequencing batch reactor was sequenced. The results showed a surprisingly variable relative abundance of *Accumulibacter* populations amongst the different granules that could only be partially explained by the “phenotype” of these granules. A co-occurrence analysis revealed a strong negative correlation between the number of *Accumulibacter* sequencing reads with the relative abundance of two bacteriophages, namely EBPR podovirus 1 (EPV1) and EBPR podovirus 3 (EPV3), that have been previously detected in a lab-scale EBPR reactor (2). These results suggest that these phages are the major reason for the variability of *Accumulibacter* relative abundance in the sampled granules which raises the question whether the *Accumulibacter* populations in the different granules have different sensitivities towards these phages.

1. Barr et al., 2010, Fems Microbiology Ecology, 631-642
2. Skennerton et al., 2011, Plos One