Bacterial quorum sensing peptides and the inter-kingdom communication with human cancer cells

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Bacteria are capable to communicate with, and to detect the number of, fellow bacteria via quorum sensing molecules. These molecules are classified in *N*-acyl homoserine lactones, furanosyl borate diesters, indole and quinolone derivatives and peptides. The crosstalk of several *N*-acyl homoserine lactones with mammalian cells has been demonstrated[1], but the effect of quorum sensing peptides on human cells remained unexplored. Our group recently demonstrated for the first time that some quorum sensing peptides interact with human colorectal carcinoma cells[2] and human breast cancer cells[3], causing enhanced *in vitro* angiogenesis and invasion. For example Phr0662 (*Bacillus* sp.), a EntF-fragment (*Enterococcus faecium*) and a EDF-fragment (*Escherichia coli*) show concentration-dependent collagen invasion. The collagen-invasive properties of aforementioned peptides are confirmed via the chorioallantoic membrane assay, the latter also demonstrating the profound effect of Phr0662 on angiogenesis. Additionally, some quorum sensing peptides are able to cross the intestinal barrier (Caco-2 model)[3] and distribute to different organs, including passing the blood-brain barrier[4]. Taken together, our findings indicate the interaction of quorum sensing peptides with human cancer cells, influencing angiogenesis and metastasis.

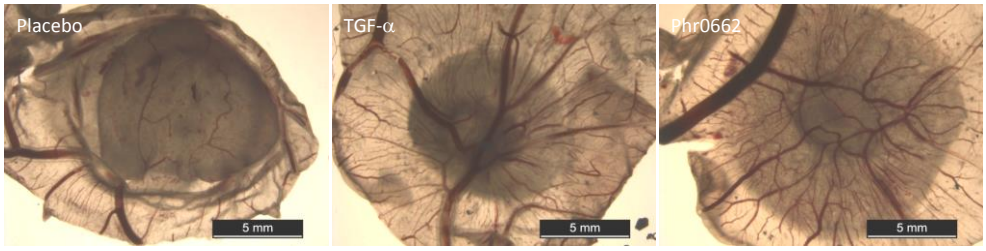

Figure 1. Indirect angiogenetic effect of Phr0662 on chicken chorioallantoic membrane, TGF-α serves as positive control.

References

1.K. P. Rumbaugh, *et al*. Curr. Opin. Microbiol. (2012), 15, 162-168.
2.E. Wynendaele, *et al*. Peptides. (2015), 64, 40-48.
3.B. De Spiegeleer, *et al*. PlosOne. (2015), 10:e0119471.
4.E. Wynendaele, *et al*. PlosOne. (2015), 10:e0142071.