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Cocoid Morphology as a Possible Manifestation of *Helicobacter pylori* Adaptation to Adverse Environments

N. F. Azevedo,*† C. Almeida, C. W. Keevil† &

M. J. Vieira*

*Center for Biological Engineering, University of Minho, Braga, Portugal, † School of Biological Sciences, University of Southampton, Southampton, United Kingdom

The pleomorphic nature of *Helicobacter pylori* has been the subject of intensive debate over the last 10 years. Because conversion from spiral to the cocoid shape is induced with exposure to detrimental environmental circumstances, the wider view up until a few years ago was that the latter represented a degrading, nonviable form of the bacterium.

When studying the adhesion of water-exposed *H. pylori* to abiotic substrata, we have found that the bacterium would assume different shapes depending on the material it was adhered to. On copper, for instance, cells would retain their spiral morphology for at least 2 months, whereas on PVC and other polymeric materials, transformation to the cocoid form was nearly complete after 192 hours. Tests with viability stains and standard cultivation methods on six different *H. pylori* strains have shown, however, that cocoid cells maintained membrane integrity for longer and that the cultivability of the bacterium increased when it was attached to PVC rather than on copper.

The spiral shape maintenance of *H. pylori* on copper can therefore be interpreted as a fast, biocidal effect of the metal upon the pathogen, killing the cell before it has time to undergo shape modification. On the other hand, for PVC coupons, the transformation into the cocoid morphology appears to be in fact a manifestation of cell adaptation to the environment. These results will allow a more effective search for the viable bacterium in drinking water distribution systems.