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***Editorial***

## **Guided tour through an unusual zoo: Spotting living organisms in uncommon habitats**

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The special issue “Living organisms on innovative substrates and materials” provides the reader with novel findings regarding the behavior of different organisms on artificial or unusual substrates. Interactions between living organisms and diverse substrates are on the one hand important to improve cell growth in biotechnology and tissue engineering, on the other hand to provide surfaces with antibacterial, fungicidal and similar properties.

The short communication “Graphene derivatives potentiate the activity of antibiotics against *Enterococcus faecium*, *Klebsiella pneumoniae* and *E. coli*” written by Butler and colleagues is an important contribution to the fight against the alarming increase in the number of key priority pathogens developing resistance against antibiotics. The antimicrobial effect of graphene, graphite and graphene oxide is well-known. In this article, the combination of these compounds with three clinically relevant antibiotics displaying different modes of activity, is described. This strategy might constitute a new approach to prevent resistant bacterial infections.

Three research articles in this special issue report on the attachment of mammalian Chinese hamster ovary (CHO) cells and certain molds, respectively, on synthetic polymers. The investigation of mammalian cell adhesion on plastic material is an important aspect for the design of novel tissue engineering scaffolds. In addition, particular attention must be paid to the sterilization of the scaffolds since the utilization of antibiotics is unfavorable. Another possible technical application might be the use of synthetic polymers as novel microcarriers for upstream bioprocessing. In contrast, adhesion of living organisms on plastic material is sometimes undesirable. In their research article, Whitehead and colleagues report on “The effect of the surface properties of poly(methyl methacrylate) on the attachment, adhesion and retention of fungal conidia”. Here, the behavior of certain molds on different polymethyl methacrylates is in the focus of their research.

The green microalga *Chlorella vulgaris* is a popular food additive due to its nutrient-content. In

addition, it can be used in the cosmetics industry or to feed aquaculture. In their contribution “Improved growth and harvesting of microalgae *Chlorella vulgaris* on textile fabrics as 2.5 D substrates”, Brockhagen and co-workers investigated novel methods to cultivate the microalga on different natural and non-natural fabrics.

Last but not least, Tsivileva and colleagues report on the effect of different synthetic acridones on the mushroom *Lentinula edodes* (shiitake). Apart from their technical use as dyes, many natural-occurring acridones were reported to display anti-inflammatory or anti-cancer effects. Thus, possible unfavorable ecological effects of these compounds must be clarified. The authors analyzed several metabolic substances in the fungus that could be attributed to the presence of the particular acridone.

Taken together, the reader gets new insights into the behavior of small organisms in unusual environments during the visit of this special zoo.



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