

The Action of Bacteriophages on Rod-Cells and Penicillin-Induced Large Bodies of *Proteus mirabilis*.

H. Böhme and U. Taubeneck

Institut für Kulturpflanzenforschung, Gatersleben and Institut für Mikrobiologie und experimentelle Therapie, Jena  
der Deutschen Akademie der Wissenschaften zu Berlin.  
*of the*

In liquid culture medium with high concentrations of penicillin *Proteus mirabilis* develops spherical large bodies which are able to return to the normal rod-like form after artificial removal of the antibiotic. In connection with studies on phage-resistance of *P. mirabilis* the reaction of normal rod-cells and large bodies to the action of bacteriophages has been compared. Lysis of rod-cells grown in an antibiotic-free medium begins 21 minutes after initiation of adsorption of phages with a multiplicity of 5; lysis is completed after 30-40 minutes. The behavior of a culture of penicillin-induced large bodies (6 to 8 hours old) after adsorption of phages with the same multiplicity is exactly like that of the culture of rod-cells. The latent period lasts 21 minutes too. Microscopic control showed that the large bodies were lysed completely. It is easy to isolate phage-resistant mutants of *P. mirabilis* by cultivation of the sensitive strain on solid media together with an excess of phages. Penicillin-induced large bodies of a phage-resistant mutant preserve phage-resistance, no lysis happens. The experiments were carried out with 2 unrelated strains of *P. mirabilis* and their phage-resistant mutants. The results were identical with both strains. The sensitivity to phages of large bodies induced from phage-sensitive rod-cells leads to the conclusion that the receptors necessary for adsorption of phages remain intact after transformation of rod-cells into large bodies. This is a difference between large bodies of *Proteus* and protoplasts produced from *E. coli* and *B. megaterium* which generally are not able to adsorb phages (for exceptions see Lederberg and Claire, Frazer and Mahler). The resistance to streptomycin of large bodies of *Proteus* and protoplasts of

*E. coli* also seems to be different. According to Lederberg and Claire penicillin-induced protoplasts of a streptomycin-resistant mutant of *E. coli* were inhibited by a streptomycin concentration of 20  $\mu\text{g/ml}$ . In our experiments the penicillin-induced large bodies of *P. mirabilis* behaved in liquid media with 400 u penicillin per ml plus 40 u streptomycin per ml in the same manner as in this medium without streptomycin; that means they were not inhibited. On solid media with serum, penicillin and streptomycin the streptomycin-resistant mutant forms L-colonies as on the same medium without streptomycin.