reaction, with phenol-sodium dodecyl sulphate (pH 9), and its comparison with the starting material by sedimentation in a sucrose gradient showed that species of all molecular weights were diminished similarly in amount. These facts indicate that enzymic attack was at, or near, the ends of chains.

The acid-soluble products of the reaction were fractionated on a column of Sephadex G-25. The smaller-molecular-weight fraction was chromatographed on Dowex 1 (Miura & Hayashi, 1967) and the larger-molecular-weight material on Sephadex G-50 in 8M-urea (Stanley, 1967). The results indicated that the DNA was converted into a mixture of mononucleotides and short-chain oligonucleotides. ATP was converted into ADP, and orthophosphate was released in approximately equivalent amount. Substantially more than 1 mole of ATP was used/mole of deoxyribonucleotide solubilized, but residual adenosine triphosphatase activity in some of the enzyme preparations resulted in uncertainty about the stoichiometry.

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Fractionation of Deoxyribonucleic Acid from Multiple-Drug-Resistant *Staphylococci* on Poly-L-Lysine-Kieselguhr Columns

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DNA has been fractionated by a variety of methods: hydroxyapatite columns (Tiselius, Hjerten & Levin, 1956; Miyazawa & Thomas, 1965), methylated albumin on kieselguhr (Mandell & Hershey, 1960; Roger, Beckmann & Hotchkiss, 1966; Ayad, Barker & Weigold, 1968), benzoylated-naphthoylated DEAE-cellulose (Sedat, Kelly & Sinsheimer, 1967) and silk-fibroin columns (Huh & Helleimer, 1967). Fractionation of DNA on poly-L-lysine-kieselguhr columns has been reported by Ayad & Blamire (1968). These authors conclude that the main basis for fractionation on poly-L-lysine-kieselguhr columns is base composition, since sonication and the consequent decrease of molecular weight did not affect the elution profile.

Heat denaturation, which disrupts the secondary structure of the DNA, also gave the same elution profile as that of native DNA. The dependence of resolution on base composition is unlike various other fractionation techniques recently reported, which depend on either molecular weight or hydrogen-bonding properties or both.

Staphylococcal DNA was resolved into several fractions by means of poly-L-lysine-kieselguhr columns. The DNA was eluted with a linear gradient of saline phosphate buffer. DNA was extracted from *Staphylococcus aureus* organisms that were multiple-drug-resistant and from their sensitive variants. The continuous elution profiles of the DNA from these organisms show a considerable degree of diversity, the most important feature being the absence of certain fractions of DNA from the antibiotic-sensitive variants. Present indications are that the DNA in the missing fractions is correlated with the absence of episomal DNA in the variants of the organisms that have lost their resistance to antibiotics. Support for this was found by comparing the DNA fractions from *Staphylococcus aureus* PS47 and a lysogenized variant of this strain that was resistant to tetracycline (strain 47'B). An extra peak in this strain accompanied lysogenization.

Our findings suggest that this technique is valuable in the study of extrachromosomal DNA of *staphylococci*.

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