prophylaxis and treatment of drug-resistant human malaria.

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Artificial Induction of Transplantation Viral Antigens in the Course of Chemical Carcinogenesis

THE *in vitro* infection with various viruses of tumours produced by carcinogens gives rise to specific transplantation viral antigens. Among the viruses which produce this effect are herpes simplex virus[1], SV_{40} (refs. 1–3), adenovirus type 16 (ref. 3), parainfluenza Sendai virus[2] and polyoma virus[1,2,4]. Moreover, infection with SV_{40} virus of tumours originally induced by polyoma virus produced a specific SV_{40} transplantation antigen[2].

Transplantation polyoma antigen has also been induced *in vivo* by inoculating polyoma virus into mice with tumours induced by carcinogens[2]. Finally, intracardiac inoculation of SV_{40} into hamsters with chemically induced sarcomata gave rise *in vivo* to transplantation antigens specific for vacuolating SV_{40} virus[3]. The experiments presented here show that viral antigens can be induced in the course of chemical carcinogenesis.

Adult Syrian hamsters (150–180 g) were injected intramuscularly with 1 mg of 7,12-dibenz-(α)-anthracene in oil. The hamsters were divided into three groups. Five hamsters of the first group were injected subcutaneously with vacuolating simian SV_{40} virus (10^7 $TCPD_{50}$/ml.). Five animals in the second group were injected in the same manner with adenovirus type 16 (10^3 $TCPD_{50}$/ml.). This virus was kindly given to us by Dr. Rosa S. Dreisin. The hamsters in the third group received nothing apart from carcinogen.

Palpable tumours appeared in all three groups after 3 months. The tumours in each group were isolated aseptically, and minced in Earle's solution without any trypsinization. Different quantities of tumour cells were administered in 0·2 ml. of solution to the three groups of hamsters. The results are presented in Table 1, which shows that the growth of the tumours induced in hamsters treated with carcinogen and adenovirus type 16 was suppressed in hamsters immunized with adenovirus. The hamsters inoculated with SV_{40} were resistant to tumours from hamsters treated with carcinogen and SV_{40}. Evidently, it is possible to obtain artificial heterogenization[1,6] in the course of chemical cancerogenesis. The mechanism of this phenomenon required further clarification. Young proliferating cells of connective tissue, the possible precursors of malignant cells, may acquire the transplantation viral antigen after infection with virus. This antigen persists in the cell through all the "precancerous" transformations. These findings, and the results of our previous experiments, show that transplantation viral antigens appear during *in vivo* and *in vitro* virus treatment of tumours induced both by carcinogens and by oncogenic virus.

The malignization and the induction of transplantation viral antigens seem to be relatively independent. It is remarkable that non-oncogenic viruses, such as herpes[1], Sendai[2], and adenovirus type 16, are capable of inducing strong transplantation antigens.

Since this communication was submitted, we have twice repeated the experiments on artificial induction of adenovirus 16 and SV_{40} transplantation antigens during chemical carcinogenesis with the same results. Artificially induced SV_{40} antigen persisted in tumour cells for at least two subsequent passages in the non-immune hamsters. We also injected adult hamsters simultaneously with 7,12-dibenz(α) anthracene and polyoma virus and adenovirus 16. The growth of the first tumour to appear in this experiment was specifically inhibited in hamsters immunized with adenovirus 16 and in those immunized with polyomavirus. Thus, the majority of these tumour cells contained two corresponding transplantation viral antigens.

Table 1. RESISTANCE OF HAMSTERS TO TUMOURS ARTIFICIALLY HETEROGENIZED DURING CHEMICAL CARCINOGENESIS

	Inoculation with 10^3 cells of hamster tumours induced by			Inoculation with 10^4 cells of hamster tumours induced by		
	Carcinogen	Carcinogen + SV_{40}	Carcinogen + adenovirus type 16	Carcinogen	Carcinogen + SV_{40}	Carcinogen + adenovirus type 16
Immunized with SV_{40}	5/5*	0/5	5/5	5/5	2/5	5/5
Immunized with adenovirus type 16	4/5	3/5	0/5	4/5	4/5	1/5
Non-immune	4/5	5/5	4/5	4/5	5/5	5/5

* Denominator indicates the number of inoculated hamsters; the numerator indicates the number of tumours which developed.

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Demonstration of Antibodies of Different Immunoglobulin Types to the O-Antigen of the Infecting *E. coli* Strain in Infants and Children with Pyelonephritis

A PASSIVE haemagglutination technique makes it possible to demonstrate high titres of antibodies against the O-antigen of the infecting *E. coli* strain in cases of acute pyelonephritis in childhood[1]. Several authors have reported that only 19*S* antibodies are formed in response to enterobacterial O-antigens in infants, children and adults[2,3], as well as in experimental animals[4]. Our investigations of the agglutinating antibodies to the O-antigen of *E. coli* strains which cause acute pyelonephritis illustrate an antibody response usually dominated by 19*S* antibodies, but in some cases also including antibodies of other immunoglobulin types.

The passive haemagglutination technique of Neter *et al.*[5] was used as previously described[1]. Sera from infants and children with acute pyelonephritis[1] and fractions of these sera, obtained by gel filtration through 'Sephadex *G*-200', were titrated before and after reduction with 2-mercaptoethanol (ME) and alkylation with iodoacetamide according to the method of Schrohenloher *et al.*[6]. In some sera the antibodies were rather unstable and the titres decreased during handling.

Titration of patient sera after reduction with ME and alkylation showed that the antibody activity was completely lost in twenty-eight out of sixty-nine sera, indicating that the predominant antibodies in these cases were of the 19*S* type. Some of these antibodies might also be IgA globulins, because they have been reported usually to be sensitive to reduction[7]. In forty-one sera some anti-