TABLE III. Radioactivity of Fatty Acids of Combined Intestinal and Cecal Contents of Cannulated and Sham-Operated Rats after Intraperitoneal Injection of C^{14}-acetate.

Time killed after inj. of C^{14}-acetate	Total fatty acids: Amt of fatty acids, mg C*	S†	Specific activity, c/m/mg fatty acid C	S	Total activity, c/m C	S
5 hr	39.0	102.0	45.6	30.2	1780	3070
5 "	74.8	17.6	13.7	21.0	1025	370
5 "	53.0	22.6	11.8	20.3	625	460
30 min.	31.1	11.8	7.3	12.0	227	142
30 "	45.5	17.6	6.0	—	272	—

* C = Cannulated rat. † S = Sham-operated rat.

also result in increased total radioactivity in the fecal fatty acids. This was observed in 3 experiments but the opposite result was obtained in a fourth experiment.

The intestinal fatty acids of cannulated rats had a higher specific activity than those of sham-operated controls. The reason for this difference is not known.

Summary. 1. Deprivation of bile flow to the rat intestine by means of cannulation of the bile duct did not affect the ability of the intestine to accumulate normal amounts of highly labeled fatty acids after administration of C^{14}-acetate as shown by comparison with sham-operated, pair-fed controls. 2. Total radioactivity in the biliary fatty acids amounted to only 5-16% of the amount found in the intestinal fatty acids in the time periods studied. 3. Fatty acids of combined intestinal and cecal contents of cannulated animals contained more fatty acid but of a lower specific activity than those of control rats.

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Additional Serotypes of the APC Virus Group. (22231)

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Six serotypes of the adenoidal-pharyngeal-conjunctival (APC) group of viruses have been described(1,2). The purpose of this communication is to report eight additional serotypes from both human and simian sources which have been isolated in this and other laboratories.

Methods for characterization and identification of APC viruses. For purposes of classification, the cardinal attribute of the APC virus group is the group specific complement fixing antigen. This antigen is not shared with other known viruses, and complement fixing antibody against it is not produced by other known infections(1-3). The procedure presently employed for determining the presence of this antigen in candidate strains is as follows: using the complement fixation procedure previously described(2), the titer of the candidate antigen is determined by testing with a pool of human convalescent serums having high titer complement fixing antibody to the group antigen. Four units of the candidate antigen is then used in tests for antibody in paired serums of at least 4 persons, each known to have been infected with a different APC type, and each showing at least an 8-fold rise against the virus antigen

TABLE I. Neutralizing Antibody Titers of APC Prototype Rabbit Antiserums Tested against Prototype Viruses.

Rabbit antiserum	Virus types 1	2	3	4	5	6	7	8	9	10	11	D.C.	S.V.$_1$	Bertha
Type 1	40	0*	0	0	0	0	0	0	0	0	0	0	0	0
2	0	40	0	0	0	0	0	0	0	0	0	0	<20†	0
3	0	0	>160	0	0	0	0	0	0	0	0	<20	"	0
4	0	0	0	320	0	0	5‡	0	0	0	0	"	"	0
5	0	0	0	0	160	0	0	0	0	0	0	0	"	0
6	0	0	5‡	0	0	80	0	0	<20	0	0	<10	"	0
7	<20	<20	<20	<20	<20	<20	320	0	"	0	0	<20	"	0
8	0	0	0	0	0	0	0	>80	"	0	0	"	0	0
9	0	0	0	0	0	0	0	0	80	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	160	0	0	0	0
11	0	0	0	0	0	0	5	0	0	0	80	0	0	0
D.C.	0	0	0	0	0	0	0	0	<10	0	0	>160	0	0
S.V.$_1$	0	0	0	0	0	0	0	0	"	0	0	<20	>40	0
Bertha	0	0	0	0	0	0	0	0	"	0	0	"	0	>320

* 0 = <5. † Lowest dilution tested. ‡ Cross neutralization not observed with all rabbit serums.

of the type responsible for infection. When at least 3 of the 4 test serums show a fourfold or greater rise to the antigens of the candidate virus, the new agent can be regarded as almost certainly a representative of the APC group. Viruses are identified by the neutralization test (procedure 2) described previously(2). New serotypes are established when in reciprocal neutralizing antibody titrations with hyperimmune rabbit antiserums, the unclassified APC virus is found to be serologically distinct from all existing types. Each new prototype is examined for the presence of other properties of APC viruses, including resistance to ether, characteristic cytopathogenicity for HeLa cell cultures, trypsinized monkey kidney cultures, and explant cultures of human embryo epithelium, and lack of pathogenicity for suckling mice, adult mice, and rabbits inoculated by several routes.

Results. Fourteen serotypes have been delineated to date. Table I shows results of representative cross neutralization tests with the prototype strains. Very little cross neutralization was evident; the only heterologous neutralizations were low level, one directional crossing between Types 3 and 6, Types 7 and 11, and Types 4 and 7. Although not expressed in Table I, partial delay in cytopathogenic effects by low dilutions of heterologous antiserums was also occasionally observed(2).

The sources of the prototype strains are recorded in Table II. Three distinct types have been placed in an "incertae sedis" category. The D.C. strain grows so slowly in tissue culture that suitable comparisons with other prototype strains can be made only with great difficulty. The S.V.$_1$ and Bertha strains have not been isolated from human sources and possibly should be listed as a separate simian series.

All types are ether resistant, share the group complement fixing antigen, and are nonpathogenic for suckling mice, adult mice, and rabbits. All produce similar cytopathogenic changes in cultures of monkey kidney, human embryo epithelium, and HeLa cells. In HeLa cells growth of each type results in production of excess acid in the culture fluids.

Several of the newly established types demonstrated minor differences from the previously described biological attributes of the APC virus group(2). The cytopathogenic changes produced in HeLa cell cultures by

TABLE II. Prototype Strains of APC Group.

Type	Strain designation	Isolated from	Diagnosis	Isolated by
1	Ad. 71	adenoid	hypertrophied tonsils & adenoids	NIH(2)
2	Ad. 6	"	*Idem*	"
3	G.B.	nasal washing	common cold volunteer	"
4	RI-67	throat washing	primary atypical pneumonia	Hilleman & Werner(3)
5	Ad. 75	adenoid	hypertrophied tonsils & adenoids	NIH(2)
6	Ton. 99	tonsil	*Idem*	"
7	Gomen	throat washing	pharyngitis	Berge(5)
8	Trim.	eye swab	epidemic keratoconjunctivitis	Jawetz(4)
9	Hicks	stool	arthritis, rheumatoid ?, myelitis ?	Kibrick(6)
10	J.J.	eye swab	conjunctivitis	NIH(7)
11	Slobitski	stool	paralytic polio (Type 1 polio also recovered)	Kibrick(6)
"Incertae sedis"	D.C.	anal swab	Niemann-Pick disease ?	NIH(7)
"	$S.V._1$	cynomolgous kidney	monkey kidney tissue culture	Hull(8)
"	Bertha	stool	chimpanzee with mild URI	Sabin & NIH(7)

Type 9, Type 10, and $S.V._1$ were characterized by discrete round cells throughout the cell sheet, without clumping. The $S.V._1$ strain, while cytopathogenic on primary passage, could not be maintained in serial passage in HeLa cell cultures, although it passed well in monkey kidney cultures. Large inocula of the D.C. strain were required to produce even abnormally delayed and slowly progressing cytopathogenic effects.

Several additional strains were not neutralized by antiserums to the fourteen prototypes, and these await completion of reciprocal tests before their qualifications as additional serotypes can be evaluated.

Summary. Fourteen serologically distinct APC virus types have now been established. Twelve types were recovered from human, and 2 from simian materials.

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