

P. and Carretti, D.: La cancerologia: nuove prospettive alla luce del vinile. Gli Ospedali

L. and Chieco, P.: Insorgenza di tumori a somministrazione per via orale. Gli Ospedali della Vita, 1975,

vinyl chloride, in "X International Conference on Cancer", 1970, Abstr. vol. 29.

, A.: oncogenic response of rats to vinyl chloride. Cancer Res.,

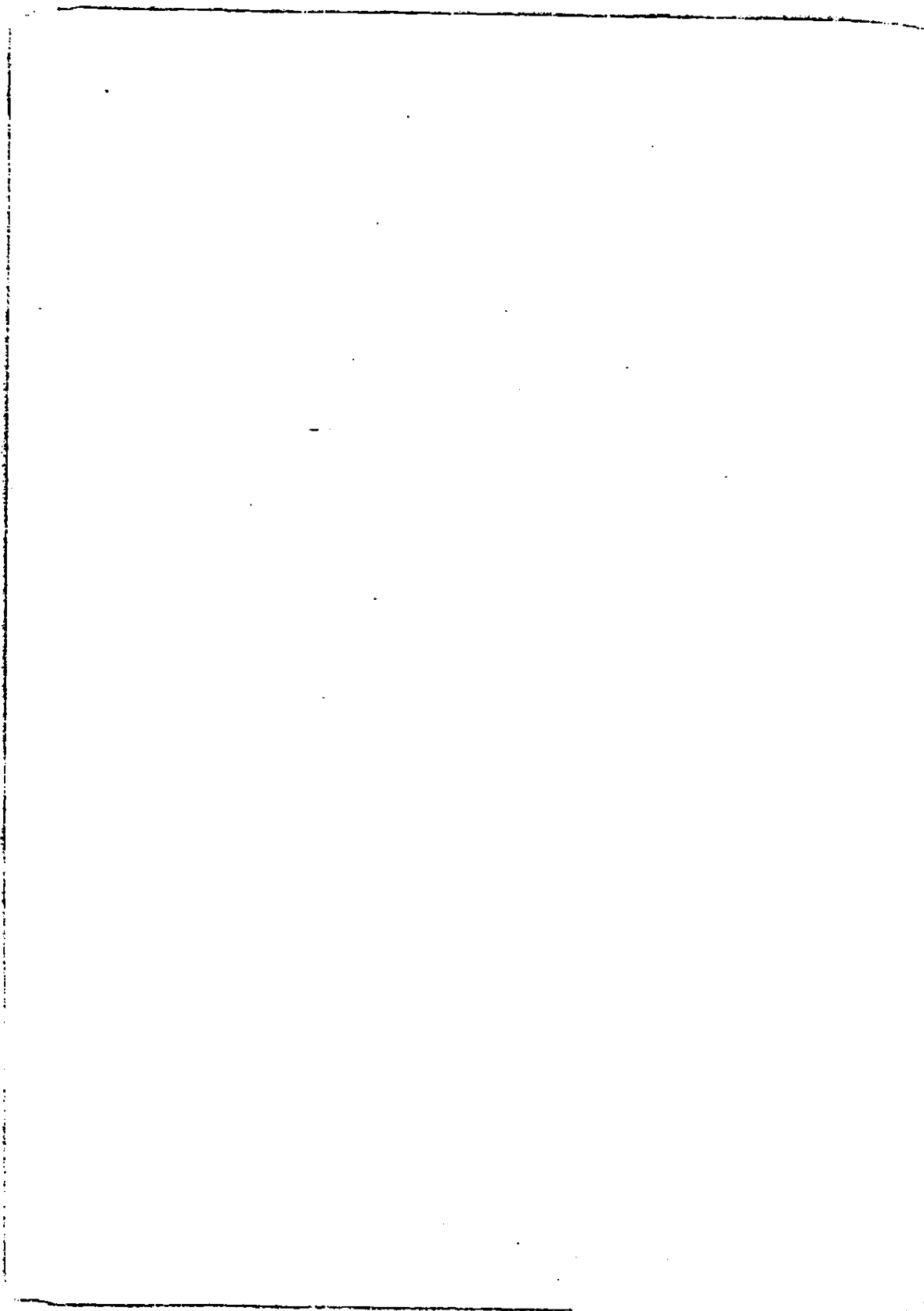
so, P.: "Subcutaneous sarcoma induced by chromium orange and lead chromate. International Symposium on the Biological Effects of Chromium Compounds, Bologna, 1973, in Addendum to the Proceedings, Section 4, Excerpta Medica.

st study of bronchial carcinogenesis by inhalation of pigments. Brit. J. Ind.

OCCUPATIONAL CHEMICAL CARCINOGENESIS

C. MALTONI

Tables 1 to 18



RSV 0012845

Table 1

CAUSES OF INCREASED ONCOGENIC RISK IN HUMAN ENVIRONMENT

- I - Concentration of oncogenic agents already present in the surface of the Earth.
- II - Surfacing of oncogenic agents from the depth of the Earth.
- III - Production of new potentially oncogenic compounds by chemical and petrochemical industry.

Table 2

KNOWLEDGE AND FACTS WHICH MAKE URGENT A NEW APPROACH
TO THE PROBLEM OF INDUSTRIAL ONCOGENESIS

- I - The potentially oncogenic agents in human environment are progressively increasing.
- II - Different oncogenic agents may have additive effects.
- III - Changes produced by oncogenic agents are largely irreversible.
- IV - Oncogenic agents may exert their effects on different organs and tissues and widely affect the target organs.
- V - A large part of the natural history of tumours take place without any clinically and sometimes otherwise detectable pathological changes.
- VI - Cancer is not a reversible disease.

Table 3
Experiments B11 and B16: Exposure by inhalation to VC in air, at 10,000, 10,000, 6,000, 2,500, 500, 250, 50 ppm.,
4 hrs. daily, 5 days weekly, for 52 weeks.
Results after 135 weeks (end of the experiments).

GROUPS AND TREATMENT	ANIMALS (SPRAGUE-DAWLEY RATS)		ANIMALS WITH TUMOURS																	
	Total	Corrected number (a)	Zybal gland carcinomas (b)			Nephroblastomas (c)			Angiosarcomas Liver (d)			Other sites	Subcuta- neous an- giosar- comas	Skin car- cinomas	Hepatomas	Brain neu- roblastoma	Mammary carcinoma	Other type and/or site (n)	Total (s)	
			No.	%	Average latency time (weeks)	No.	%	Average latency time (weeks)	No.	%	Average latency time (weeks)									No.
VC 10,000 ppm.	60	60	35	58	43	-	-	-	18	30	53	1 (e)	-	-	-	-	-	27 (u)	51	
VC 10,000 ppm.	60	61	16	26	50	5	8	59	9	15	64	3 (f)	4	3	1	7	3	4 (p)	38	
VC 6,000 ppm.	72	60	7	12	62	4	7	65	13	22	70	3 (g)	3	1	1	3	-	8 (a)	31	
VC 2,500 ppm.	74	59	2	3	33	6	10	74	13	22	78	3 (h)	3	1	2	5	1	3 (r)	32	
VC 500 ppm.	67	59	4	7	79	4	7	83	7	12	81	2 (i)	1	1	3	-	1	3 (s)	22	
VC 250 ppm.	67	59	-	-	-	6	10	80	4	7	79	2 (j)	-	4	-	-	1	2 (t)	16	
VC 50 ppm.	64	59	-	-	-	1	2	135	1	2	135	1 (m)	1	1	-	-	2	7 (u)	10	
No treatment	68	58	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10 (v)	6	
Total	541	475	64	-	-	26	-	-	63	-	-	15	12	11	7	15	8	64	206	

- a) Alive animals after 24 weeks, when the first tumour (a zybal gland carcinoma) was observed. The percentages are referred to the corrected number.
b) Metastases to lung.
c) Metastases to liver, lung, spleen and brain.
d) Metastases to lung.
e) 1 lung angiosarcoma.
f) 1 intrabdominal angiosarcoma (next to liver); 1 angiosarcoma of the lips; 1 angiosarcoma of the nose.
g) 1 angiosarcoma in subcutaneous fibrous angiosarcoma; 1 ossifying paravascular angiosarcoma; 1 intrabdominal angiosarcoma (next to liver).
h) 1 ossifying angiosarcoma of neck; 2 intrabdominal angiosarcomas (1 next to spleen and 1 next to ovary).
i) 1 angiosarcoma of uterus; 1 lung angiosarcoma.
j) 1 intrabdominal angiosarcoma (next to spleen); 1 intrathoracic ossifying angiosarcoma.
k) 1 intrabdominal diffusely angiosarcoma.
l) Several cases of breast fibroadenomas, adrenal and pituitary tumours (generally adenomas) have not been considered, since their distribution in the different groups does not vary.
m) 7 zybal gland adenomas; 1 skin squamous carcinoma; 1 subcutaneous fibrosarcoma; 2 mammary carcinomas; 1 hepatic angiosarcoma; 1 hepatoma; 1 ovarian angiosarcoma; 1 forestomach papilloma; 1 brain neuroblastoma; 1 Harderian gland carcinoma.
n) 2 zybal gland adenomas; 1 ovarian cystadenocarcinoma; 1 neurilemmoma.
o) 4 zybal gland adenomas; 2 hepatic and 1 peritoneal angiosarcoma; 1 salivary gland adenocarcinoma.
p) 1 zybal gland adenoma; 2 ependymomas.
q) 1 pulmonary fibrosarcoma; 2 lymphomas.
r) 1 zybal gland adenoma; 1 lymphoma.
s) 1 zybal gland adenoma; 1 subcutaneous angiosarcoma; 1 uterine adenocarcinoma (1 with sarcomatous component).
t) 1 invasive squamous of zybal gland; 1 subcutaneous fibrosarcoma; 2 peritoneal fibrosarcomas; 2 uterine adenocarcinomas (1 with sarcomatous component); 1 uterine leiomyosarcoma; 1 ovarian fibrosarcoma; 1 pulmonary rhabdomyosarcoma; 1 lymphoma.
u) Several animals with 2 or more tumours.

- i) 1 intrabdominal angiosarcoma (next to liver); 1 angiosarcoma of the li; angiosarcoma of the nose.
 c) 1 angiosarcoma in subcutaneous fibroangiosarcoma; 1 ossifying parosteoma. angiosarcoma; 1 intrabdominal angiosarcoma (next to liver).
 h) 1 ossifying angiosarcoma of neck; 2 intrabdominal angiosarcomas (1 next to spleen and 1 next to ovary).
 j) 1 angiosarcoma of uterus; 1 lung angiosarcoma.
 l) 1 intrabdominal angiosarcoma (next to spleen); 1 intrathoracic ossifying angiosarcoma.
 m) 1 intrabdominal diffused angiosarcoma.
 n) Several cases of breast fibroadenomas, adrenal and pituitary tumours (generally adenomas) have not been considered, since their distribution in the different groups does not vary.
 o) 7 Zymbal gland adenomas; 1 skin squamous carcinoma; 1 subcutaneous fibroangiosarcoma; 2 mammary carcinomas; 1 hepatic angiosarcoma; 1 hepatoma; 1 ovarian angiosarcoma; 1 forestomach papilloma; 1 brain neuroblastoma; 1 Harderian gland carcinoma.
 p) 2 Zymbal gland adenomas; 1 ovarian cytotendencarcinoma; 1 neurilemmoma.
 q) 4 Zymbal gland adenomas; 2 hepatic and 1 peritoneal angiosarcoma; 1 salivary gland adenocarcinoma.
 r) 1 Zymbal gland adenoma; 2 epenlythomas.
 s) 1 pulmonary fibrocarcoma; 2 lymphomas.
 t) 1 Zymbal gland adenoma; 1 lymphoma.
 u) 3 Zymbal gland adenomas; 1 subcutaneous angioepithelioma; 3 uterine adenocarcinomas (1 with sarcomatous component).
 v) 1 invasive acanthoma of Zymbal gland; 1 subcutaneous fibrocarcoma; 2 peritoneal fibroangiosarcoma; 2 uterine adenocarcinomas (1 with sarcomatous component); 1 uterine leiomyosarcoma; 1 ovarian fibrocarcoma; 1 pulmonary rhabdomyosarcoma; 1 lymphoma.
 z) Several animals with 2 or more tumours.

Table 4

Experiment BT4: Exposure by inhalation to VC in air at 10,000, 6,000, 2,500, 500, 250, 50 ppm., for 4 hrs. daily, 5 days weekly, for 30 weeks.
Results after 81 weeks (end of the experiment).

GROUPS AND TREATMENT	ANIMALS (SWISS MICE)						ANIMALS WITH TUMOURS											
	Total			Corrected number (a)			Lung tumours (b)			Mammary carcinomas (c)			Liver an- giosarcomas	Vascular tumours of other type and/or site	Epithelial tumours of the skin	Other type and/or site	Total (z)	
	♂ ^a	♀	♂♀	♂	♀	♂♀	No.	%	Average latency time (weeks)	No.	%	Average latency time (weeks)	No.	No.	No.	No.	No.	
VC 10,000 ppm. I	30	30	60	22	28	50	35	70	36	13	47	31	8	9 (d)	3 (m)	2 (r)	36	
VC 6,000 ppm. II	30	30	60	26	28	54	38	70	38	8	28	33	5	9 (e)	6 (n)	4 (s)	39	
VC 2,500 ppm. III	30	30	60	23	30	53	30	57	43	9	30	35	11	12 (f)	3 (o)	2 (t)	31	
VC 500 ppm. IV	30	30	60	29	29	58	38	66	41	7	24	37	11	18 (g)	1 (p)	1 (u)	43	
VC 250 ppm. V	30	30	60	29	29	58	33	57	45	11	32	39	11	22 (h)	2 (q)	3 (v)	40	
VC 50 ppm. VI	30	30	60	27	30	57	2	3.5	51	12	33	43	1	13 (i)	-	1 (w)	18	
No treatment VII	80	70	150	74	67	141	8	6	44	-	-	-	-	3 (j)	-	7 (y)	13	
Total	260	250	510	230	241	471	184	-	-	60	-	-	47	84	15	20	270	

- a) Alive animals after 16 weeks, when the first tumour (a mammary carcinoma) was observed. The percentages are referred to the corrected number.
 b) Adenomas, some of which undergoing malignant transformation.
 c) In females. Adenocarcinomas frequently with areas of squamous metaplasia.
 d) 3 subcutaneous angiosarcomas; 4 liver fibroangiosarcomas; 1 heart fibroangiosarcoma; 1 ossifying interscapular angiosarcoma.
 e) 1 subcutaneous angiosarcoma; 2 liver fibroangiosarcomas; 4 liver angiosarcomas; 1 renal fibroangiosarcoma; 1 thymus angiosarcoma.
 f) 1 subcutaneous angiosarcoma; 1 subcutaneous angiosarcoma; 3 liver angiosarcomas; 2 intrabdominal angiosarcomas; 2 renal angiosarcomas; 1 lung angiosarcoma.
 g) 2 subcutaneous angiosarcomas; 1 subcutaneous fibroangiosarcoma; 1 subcutaneous angiosarcoma; 4 liver fibroangiosarcomas; 1 liver angiosarcoma; 3 intrabdominal angiosarcomas; 1 intrabdominal fibroangiosarcoma; 1 renal angiosarcoma; 1 testicular fibroangiosarcoma; 1 angiosarcoma of the oesophagus; 1 lung fibroangiosarcoma; 1 lung angiosarcoma.
 h) 1 subcutaneous angiosarcoma; 6 liver fibroangiosarcomas; 10 liver angiosarcomas; 2 intrabdominal angiosarcomas; 1 ovarian angiosarcoma; 1 scrotal angiosarcoma; 1 lung angiosarcoma.
 i) 1 subcutaneous angiosarcoma; 1 subcutaneous fibroangiosarcoma; 2 subcutaneous angiosarcomas; 2 liver fibroangiosarcomas; 3 liver angiosarcomas; 1 intrabdominal angiosarcoma; 1 ovarian angiosarcoma; 1 intrathoracic fibroangiosarcoma; 1 angiosarcoma of the interscapular fat pad.
 j) 1 angiosarcoma of uterus.
 k) 2 squamous carcinomas; 1 invasive acanthoma.
 l) 5 squamous carcinomas; 1 acanthoma.
 m) 1 squamous carcinoma; 2 acanthomas.
 n) 1 acanthoma.
 o) 1 skin adenocarcinoma; 1 basaloma.
 p) 1 Zymbal gland adenoma; 1 forestomach papilloma.
 q) 1 subcutaneous leiomyosarcoma; 1 forestomach papilloma; 1 Harderian gland adenoma; 1 lymphoma.
 r) 1 forestomach papilloma; 1 parotid gland mixed tumour.
 s) 1 Zymbal gland adenoma.
 t) 1 Zymbal gland adenoma; 1 Leydig cell tumour; 1 lymphoma.
 u) 1 parotid gland adenocarcinoma.
 v) 1 subcutaneous leiomyosarcoma; 1 adenoma of colon; 1 ovarian carcinoma; 1 leiomyosarcoma of uterus; 3 lymphomas.
 w) 1 subcutaneous leiomyosarcoma; 1 adenoma of colon; 1 ovarian carcinoma; 1 leiomyosarcoma of uterus; 3 lymphomas.
 z) Several cases with 2 or more tumours.

Table 5

Experiment BT6 : Exposure by inhalation to VC in air at 10,000, 6,000, 2,500, 500, 250, 50 ppm., 4 hrs. daily, 5 days weekly, for 30 weeks.
Results after 106 weeks.

GROUPS AND TREATMENT	ANIMALS (GOLDEN HAMSTERS)		ANIMALS WITH TUMOURS						
	Total	Survivors	Liver angiosarcomas	Skin trichosporiomas and basalomas (a)	Melanomas	Lymphomas	Forestomach epithelial tumours (b)	Other type and/or site	Total (g)
			No.	No.	No.	No.	No.	No.	No.
I									
VC 10,000 ppm.	35	-	-	6	1	-	4	2 (c)	4
II									
VC 6,000 ppm.	32	-	1	2	2	2	7	7 (d)	10
III									
VC 2,500 ppm.	33	-	-	1	-	1	10	3 (e)	12
IV									
VC 500 ppm.	33	-	2	3	-	1	7	2 (f)	12
V									
VC 250 ppm.	32	-	-	3	-	1	2	-	6
VI									
VC 50 ppm.	33	-	-	6	1	1	4	-	10
VII									
No treatment	70	1	-	2	-	2	-	-	5
Total	268	1	3	23	4	8	34	14	59

- a) Several cases with acanthosis and some undergoing malignant transformation.
b) Papillomas, acanthomas, some of which undergoing malignant transformation.
c) 1 subcutaneous angioma; 1 gall-bladder adenocarcinoma.
d) 2 hepatomas; 2 liver fibrosarcomas; 2 liver angiosarcomas; 1 biliducts adenocarcinoma.
e) 1 hepatoma; 1 liver fibrosarcoma; 1 liver angioma.
f) 1 subcutaneous angioma; 1 bronchial carcinoma.
g) Several animals with 2 or more tumours.

Table 6

Experiment BT11 : Exposure by ingestion (stomach tube) to VC in olive oil, at 50.00, 16.65, 3.33 mg/Kg body weight, once daily, 4-5 days weekly, for 52 weeks.
Results after 84 weeks.

GROUPS AND TREATMENT	ANIMALS (SPRAGUE-DAWLEY RATS)		ANIMALS WITH TUMOURS					
	Total	Survivors	Cybal gland carcinomas	Nephroblastomas	Angiosarcomas		Other type and/or site (b)	Total
			No.	No.	Liver	Other sites		
I								
VC 50.00 mg/Kg	80	25	-	-	8	1 (a)	3 (c)	11 (d)
II								
VC 16.65 mg/Kg	80	33	1	1	5	-	-	7
III								
VC 3.33 mg/Kg	80	39	-	-	-	-	-	-
IV								
Control olive oil	80	37	-	-	-	-	-	-
Total	320	134	1	1	13	1	3	18

- a) 1 thymus angiosarcoma.
b) Several cases of breast fibrosarcomas; adrenal and pituitary tumours (generally adenomas) have not been considered, since their distribution in the different groups does not vary.
c) 1 mammary carcinoma; 2 forestomach papillomas.
d) 1 animal with 2 tumours.

10,000, 6,000, 2,500,
weekly, for 30 weeks.

WITH TUMOURS			
phomas	Forestomach epithelial tumours (b)	Other type and/or site	Total (g)
No.	No.	No.	No.
-	4	2 (c)	4
2	7	7 (d)	10
1	10	3 (e)	12
1	7	2 (f)	12
1	2	-	6
1	4	-	10
2	-	-	5
5	14	14	59

tion.
tion.
mocarcoma.

VC in olive oil,
daily.

WITH TUMOURS			
Other sites	Other type and/or site (b)	Total	
No.	No.	No.	No.
1 (a)	3 (c)	11 (d)	
-	-	7	
-	-	-	
-	-	-	
1	3	18	

n (generally adenomas) have
pe does not vary.

Table 7

Experiment B75 : Exposure by inhalation to VC in air at 10,000 and 6,000 ppm.
of breeders, 4 hrs. daily, for 1 week (from 12th to 18th day
of pregnancy).
Results after 14 weeks (end of the experiment).

GROUPS AND TREATMENT	ANIMALS (SPRAGUE-DAWLEY RATS)		ANIMALS WITH TUMOURS					
	Total	Survivors	Zybal gland carcinomas	Nephrobla- stomas	Angiosarcomas		Other type and/or site	Total
					Liver	Other sites		
			No.	No.	No.	No.	No.	No.
I VC 10,000 ppm. Breeders	30	-	1	-	-	1 (a)	2 (d)	3
II VC 6,000 ppm. Breeders	30	-	-	-	-	-	-	-
III VC 10,000 ppm. Offspring	54	-	3	1	-	2 (b)	2 (a)	8
IV VC 6,000 ppm. Offspring	32	-	1	-	-	2 (c)	4 (f)	6
Total	146	-	5	1	-	5	8	17

- a) 1 intrabdominal angiosarcoma.
b) 1 subcutaneous angiosarcoma; 1 angiosarcoma of the leg.
c) 1 subcutaneous angiosarcoma; 1 intrabdominal angiosarcoma.
d) 1 liver fibrosarcoma; 1 liver angiosarcoma.
e) 1 zybal gland fibrosarcoma; 1 ovarian leiomyosarcoma.
f) 1 zybal gland adenoma; 1 skin carcinoma; 1 subcutaneous fibrosarcoma; 1 mammary carcinoma.

Table 8

TUMOURS PRESENTLY CORRELATED TO VC EXPOSURE (BY INHALATION), ON EXPERIMENTAL RODENTS AND MAN

Species	TUMOURS										
	Angiosarcomas of liver	Tumours of brain	Tumours of lung	Lymphomas and leukemias	Angiosarcomas and angiosarcomas of other sites	Nephroblastomas	Sebaceous cutaneous carcinomas	Squamous tumours of epidermis	Keratinocarcinomas	Hepatomas	Fore-stomach papillomas and acanthomas
Rat	+	+			+	+	+	+	(+)	+	+
Mouse	+		+		+		+	+	+		+
Hamster	+		(+)	(+)	(+)			+		(+)	+
Man	+	(+)	(+)	(+)						(+)	

Table 9

Experiment BT10 : Exposure by inhalation to VC for 100 hrs., following different schedules.
Results after 59 weeks.

GROUPS AND TREATMENT	ANIMALS (SPRAGUE-DAWLEY RATS)		ANIMALS WITH TUMORS					Total
			Zybal gland carcinomas	Nephroblg stomas	Angiosarcomas		Other type and/or site	
	Total	Survivors	No.	No.	Liver	Other sites	No.	
I VC 10,000 ppm. 4hd/5dw/5w	120	84	4	-	-	-	-	4
II VC 6,000 ppm. 4hd/5dw/5w	120	85	3	-	-	-	1 (b)	4
III VC 10,000 ppm. 1hd/4dw/25w	120	89	4	-	-	-	-	4
IV VC 6,000 ppm. 1hd/4dw/25w	120	85	-	-	-	1 (a)	-	1
V VC 10,000 ppm. 4hd/1dw/25w	120	96	2	-	-	-	1 (c)	3
VI VC 6,000 ppm. 4hd/1dw/25w	120	97	-	-	-	-	1 (d)	1
VII No treatment	240	180	-	-	-	-	-	-
Total	960	716	13	-	-	1	3	17

- a) 1 subcutaneous angiosarcoma,
b) 1 lymphoma,
c) 1 subcutaneous angioepithelioma,
d) 1 lymphoma.

Table 10

Experiment BT9 : Exposure by inhalation to VC in air at 50 ppm., 4 hrs. daily,
5 days weekly, for 52 weeks.
Results after 59 weeks.

GROUPS AND TREATMENT	ANIMALS (SPRAGUE-DAWLEY RATS)		ANIMALS WITH TUMORS					Total
			Zybal gland carcinomas	Nephroblg stomas	Angiosarcomas		Other type and/or site	
	Total	Survivors	No.	No.	Liver	Other sites	No.	
I VC 50 ppm.	300	216	1	-	-	-	-	1
II No treatment	100	72	-	-	-	-	-	-
Total	400	288	1	-	-	-	-	1

..., following different schedules.

ANGIOSARCOMAS WITH TUMOURS			
Angiosarcomas		Other type and/or site	Total
Liver	Other sites		
No.	No.	No.	No.
-	-	-	4
-	-	1 (b)	4
-	-	-	4
-	1 (a)	-	1
-	-	1 (c)	3
-	-	1 (d)	1
-	-	-	-
-	1	3	17

at 50 ppm., 4 hrs. daily,

ANGIOSARCOMAS WITH TUMOURS			
Angiosarcomas		Other type and/or site	Total
Liver	Other sites		
No.	No.	No.	No.
-	-	-	1
-	-	-	-
-	-	-	1

Table 11

Experiment BT15 : Exposure by inhalation to VC in air, at 25, 10, 5, 1 ppm., 4 hrs. daily, 5 days weekly, for 52 weeks.
Results after 46 weeks.

GROUPS AND TREATMENT	ANIMALS (SPRAGUE-DAWLEY RATS)		ANGIOSARCOMAS WITH TUMOURS					
			Zybal gland carcinomas	Nephroblastomas	Angiosarcomas		Other type and/or site	Total
					Liver	Other sites		
	Total	Survivors	No.	No.	No.	No.	No.	No.
I								
VC 25 ppm.	120	110	-	-	-	-	-	-
II								
VC 10 ppm.	120	111	-	-	-	-	-	-
III								
VC 5 ppm.	120	113	-	-	-	-	-	-
IV								
VC 1 ppm.	120	112	-	-	-	-	-	-
V								
No treatment	120	97	-	-	-	-	-	-
Total	600	543	-	-	-	-	-	-

Table 12

Experiment BT17 : Exposure by inhalation to VC in air at 1 ppm., 4 hrs. daily, 5 days weekly, for 52 weeks.
Results after 46 weeks.

GROUPS AND TREATMENT	ANIMALS (WISTAR RATS)		ANGIOSARCOMAS WITH TUMOURS					
			Zybal gland carcinomas	Nephroblastomas	Angiosarcomas		Other type and/or site	Total
					Liver	Other sites		
	Total	Survivors	No.	No.	No.	No.	No.	No.
I								
VC 1 ppm.	120	96	-	-	-	-	-	-
II								
No treatment	130	89	-	-	-	-	-	-
Total	250	185	-	-	-	-	-	-

Table 13

Experiment BT27 : Exposure by ingestion (stomach tube) to VC in olive oil,
at 1, 0.3, 0.03 mg/Kg body weight, once daily, 4-5 days
weekly, for 104 weeks.
Results after 21 weeks.

GROUPS AND TREATMENT	ANIMALS (SPRAGUE-DAWLEY RATS)		ANIMALS WITH TUMOURS					
	Total	Survivors	Zymbal gland carcinomas	Nephrobla stomas	Angiosarcomas		Other type and/or site	Total
			No.	No.	Liver No.	Other sites No.		
I VC 1 mg/Kg/bw	158	147	-	-	-	-	-	-
II VC 0.3 mg/Kg/bw	159	145	-	-	-	-	-	-
III VC 0.03 mg/Kg/bw	163	147	-	-	-	-	-	-
IV Control: olive oil	159	148	-	-	-	-	-	-
Total	639	587	-	-	-	-	-	-

144

RSV 0012853

Table 14

III VC 0.03 mg/Kg/bw	163	147	-	-	-	-	-	-
IV Control: olive oil	159	148	-	-	-	-	-	-
Total	639	587	-	-	-	-	-	-

Table 14

Experiments B012 and BT2001 : Treatment: 1 subcutaneous injection of 30 mg of the compound in 1 cc of H₂O.

Groups and Treatment	Animals (1) (Sprague-Dawley rats)		Tumours (sarcomas at the site of injection)			Ended Experiments length (weeks)	Ongoing experiments Time from start (weeks)
	Total	Survivors	No. of animals with tumours	Average latency time (weeks)	Histology type		
I Chromite	40	-	-	-	-	133	
II Neochromium	40	-	9	78	Rhabdomyosarcomas and fibrosarcomas	149	
III Chromium allumen	40	-	8	72	Rhabdomyosarcomas and fibrosarcomas	137	
IV Chromium yellow (Lead chromate)	40	-	26	40	Rhabdomyosarcomas and fibrosarcomas	150	
V Chromium orange (Lead chromate)	40	-	27	47	Rhabdomyosarcomas and fibrosarcomas	150	
VI Molybdenum orange (Lead chromate, sulphate and molybdate)	40	-	36	32	Rhabdomyosarcomas and fibrosarcomas	117	
VII Cadmium yellow (Cadmium sulphide)	40	-	16	86	Rhabdomyosarcomas and fibrosarcomas	143	
VIII Iron yellow (Iron oxide)	40	-	1	77	Rhabdomyosarcomas and fibrosarcomas	125	
IX Iron red (Iron oxide)	40	-	-	-	-	134	
X Control	140	-	-	-	-	127	
XI Titanium oxide	120	116	-	-	-		35
XII Zinc chromate	80	80	-	-	-		4

(1) 50% males, 50% females

Table 15

PLAN OF THE EXPERIMENTS ON THE BIOLOGICAL EFFECTS OF STYRENE

Experiments	Species and age at start (weeks)	Groups	No. of animals at start			Treatment					Weeks from start
			Total	♂	♀	Route	Dose	Stopped	Ongoing	Length (weeks)	
BT101	Rats (13)	I	60	30	30	Inhalation	300 ppm		+	44	44
		II	60	30	30	"	200 ppm		+	44	44
		III	60	30	30	"	100 ppm		+	44	44
		IV	60	30	30	"	50 ppm		+	44	44
		V	60	30	30	"	25 ppm		+	44	44
		VI	120	60	60	Untreated (controls)	-				44
		Total	420	210	210						
BT102	Rats (13)	I	80	40	40	Ingestion	250 mg/Kg in olive oil		+	37	37
		II	80	40	40	"	50 mg/Kg in olive oil		+	37	37
		III	80	40	40	"	control: olive oil		+	37	37
		Total	240	120	120						
BT103	Rats (13)	I	80	40	40	4 intrabdominal injections	50 mg in olive oil (x 4)	+			38
		II	80	40	40	"	control: olive oil	+			38
		Total	160	80	80						
BT104	Rats (13)	I	80	40	40	1 subcutaneous injection	50 mg in olive oil	+			38
		II	80	40	40	"	control: olive oil	+			38
		Total	160	80	80						
TOTAL			980	490	490						

Table 16

RSV 0012855

		TOTAL		240	120				
BT103	Rats (13)	I		80	40	40	4 intrabdominal injections	50 mg in olive oil (x 4)	+
		II		80	40	40	"	control: olive oil	+
		Total		160	80	80			
BT104	Rats (13)	I		80	40	40	1 subcutaneous injection	50 mg in olive oil	+
		II		80	40	40	"	control: olive oil	+
		Total		160	80	80			
TOTAL				960	480	480			

Tabl. 16

PLAN OF THE EXPERIMENTS ON THE BIOLOGICAL EFFECTS OF ACRYLONITRILE

Experiments	Species and age at start (weeks)	Groups	No. of animals at start		Treatment					Weeks from start		
			Total	♂	♀	Route	Dose	Stopped	Ongoing		Length (weeks)	
BT201	Rats (12)	I	62	32	30	Inhalation	40 ppm		+	35	35	
		II	60	30	30	"	20 ppm		+	35	35	
		III	60	30	30	"	10 ppm		+	35	35	
		IV	60	30	30	"	5 ppm		+	35	35	
		V	60	30	30	Untreated (controls)	-				35	
		Total	302	152	150							
BT202	Rats (12)	I	105	58	47	Ingestion (1)	20 mg/kg in olive oil	+		6	35	
		II	80	40	40	"	control: olive oil	+		6	35	
		Total	185	98	87							
BT203	Rats (10)	I	82	42	40	Ingestion (2)	5 mg/kg in olive oil		+	21	21	
		II	158	82	76	"	control: olive oil		+	21	21	
		Total	240	124	116							
TOTAL			727	374	353							

(1) 3-5 times weekly

(2) 3 times weekly

Table 17

PLAN OF THE EXPERIMENTS ON THE BIOLOGICAL EFFECTS OF VINYLIDENE CHLORIDE

Experiments	Species and age at start (weeks)	Groups	No. of animals at start			Treatment					Weeks from start
			Total	♂	♀	Route	Dose	Stopped	Ongoing	Length (weeks)	
BT401	Rats (16)	I	120	60	60	Inhalation	150 ppm		+	21	21
		II	60	30	30	"	100 ppm		+	21	21
		III	60	30	30	"	50 ppm		+	21	21
		IV	60	30	30	"	25 ppm		+	21	21
		V	60	30	30	"	10 ppm		+	21	21
		VI	200	100	100	Untreated (controls)	-				21
		Total	560	280	280						
BT402	Mice (16)	I	120	60	60	Inhalation	200 ppm	+		2 days	21
		II	60	30	30	"	100 ppm	+		2 days	21
		III	60	30	30	"	50 ppm	+		4 days	21
		IV	60	30	30	"	25 ppm		+	21	21
		V	240	120	120	"	25 ppm		+	19	19
		VI	60	30	30	"	10 ppm		+	21	21
		VII	200	100	100	Untreated (controls)	-				21
		Total	800	400	400						
BT403	Rats (9)	I	100	50	50	Ingestion	20 mg/Kg in olive oil		+	32	32
		II	100	50	50	"	10 mg/Kg in olive oil		+	32	32
		III	100	50	50	"	5 mg/Kg in olive oil		+	32	32
		IV	200	100	100	"	control:olive oil		+	32	32
		Total	500	250	250						
BT404	Rats (9)	I	100	50	50	Ingestion	0.5 mg/Kg in olive oil		+	21	21
BT405	Chinese Hamsters (28)	I	60	30	30	Inhalation	25 ppm		+	13	13
		II	35	18	17	Untreated (controls)	-				13
		Total	95	48	47						
TOTAL			3,065	1,532	1,533						

	(9)	I	100	50	50	Ingestion	olive oil	+	32	32
		II	100	50	50	"	10 mg/kg in olive oil	+	32	32
		III	100	50	50	"	5 mg/kg in olive oil	+	32	32
		IV	200	100	100	"	control:olive oil	+	32	32
		Total	500	250	250					
BT404	Rats (9)	I	100	50	50	Ingestion	0.5 mg/kg in olive oil	+	21	21
BT405	Chinese Hamsters (28)	I	60	30	30	Inhalation	25 ppm	+	13	13
		II	35	18	17	Untreated (controls)	-			13
		Total	95	48	47					
TOTAL			2,055	1,028	1,027					

Table 18

Experiment BT1001 : Treatment: 1 subcutaneous injection of 2 mg of Adriamycin in 1 cc of olive oil.
Results : after 38 weeks.

GROUPS AND TREATMENT	ANIMALS (SPRAGUE-DAWLEY RATS)				TUMOURS (1)		AVERAGE LATENCY TIME (weeks)	
	Sex	Number	Corrected number	Survivors	No.	%	First tumour	Average
I Adriamycin 2 mg	♀	42	42	35	14	35	19	31
	♂	40	40	30	12	30	25	32
II Control: olive oil	♀	40	40	34	-	-	-	-
	♂	40	39	30	-	-	-	-
Total	♀ ♂	162	161	129	26			

(1) At the site of injection.