

APPENDIX 1

SUMMARY TABLES OF GENETIC AND RELATED EFFECTS

Summary table of genetic and related effects of chromium compounds

Nonmammalian systems													Mammalian systems																			
Prokaryotes		Lower eukaryotes				Plants			Insects				In vitro										In vivo									
D	G	D	R	G	A	D	G	C	R	G	C	A	Animal cells					Human cells					Animals					Humans				
													D	G	S	M	C	A	T	I	D	G	S	M	C	A	T	I	D	G	S	M

Cr[III] compoundsChromic chloride [CrCl₃·6H₂O]- - +¹ +¹ - - - ? +¹ -Chromic acetate [Cr(CH₃COO)₃]? - - ? + +¹ +¹Chromic nitrate [Cr(NO₃)₃·9H₂O]+ - +¹ -¹ - -¹ -¹Chromic sulfate [Cr₂(SO₄)₃·4-8H₂O]

- - - ?

Chromic potassium sulfate [CrK(SO₄)₂·2H₂O]- - +¹ - +Chromium alum [Cr₂(SO₄)₃·K₂SO₄·H₂O]

- - +

Neochromium [Cr₂(OH)SO₄·Na₂SO₄·H₂O]- -¹ +¹Chromic oxide [Cr₂O₃]-¹ +¹ ?Chromite ore [Cr₂O₃·Fe₂O₃·Al₂O₃·SiO₂·CaO]

[+] [+] [+]

Cupric chromite [Cr₂O₃·2CuO]+¹

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Chromium compounds (contd)

Nonmammalian systems													Mammalian systems																													
Prokaryotes		Lower eukaryotes				Plants			Insects				In vitro														In vivo															
D	G	D	R	G	A	D	G	C	R	G	C	A	Animal cells							Human cells							Animals						Humans									
													D	G	S	M	C	A	T	I	D	G	S	M	C	A	T	I	D	G	S	M	C	DL	A	D	S	M				
Molybdenum orange [PbCrO ₄ .PbSO ₄ .SiO ₂ .Al ₂ O ₃ .PbMoO ₄]																																										
+ ¹																				+							+ ¹															
Barium chromate [BaCrO ₄]																																										
- ¹																				+ ¹																						
Lead chromate [PbCrO ₄]																																										
-	(+)	(+)¹								(+)¹					-¹	-	+	+			+					(+)¹	+¹	(+)¹					+¹									
Chromium yellow [PbCrO ₄ .PbSO ₄ .SiO ₂ .Al ₂ O ₃]																																										
(+)¹																				+							+¹															
Chromyl chloride [Cl ₂ CrO ₂]																																										
+																																										
Other Cr compounds																																										
Chromous[II] chloride [CrCl ₂]																																										
+¹													-¹							-¹														-¹								
Chromium[0] carbonyl [Cr(CO) ₄]																																										
-¹													-¹																													

A, aneuploidy; C, chromosomal aberrations; D, DNA damage; DL, dominant lethal mutation; G, gene mutation; I, inhibition of intercellular communication; M, micronuclei; R, mitotic recombination and gene conversion; S, sister chromatid exchange; T, cell transformation

In completing the tables, the following symbols indicate the consensus of the Working Group with regard to the results for each endpoint:

- + considered to be positive for the specific endpoint and level of biological complexity
- +¹ considered to be positive, but only one valid study was available to the Working Group
- [+] results were available only for products contaminated with traces of Cr[VI]
- (+) positive when artificially solubilized in acids or alkali
- considered to be negative
- ¹ considered to be negative, but only one valid study was available to the Working Group
- ? considered to be equivocal or inconclusive (e.g., there were contradictory results from different laboratories; there were confounding exposures; the results were equivocal)

APPENDIX I

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Nickel compounds (contd)

Nonmammalian systems													Mammalian systems																										
Prokaryotes		Lower eukaryotes				Plants			Insects				In vitro													In vivo													
D	G	D	R	G	A	D	G	C	R	G	C	A	Animal cells								Human cells					Animals							Humans						
													D	G	S	M	C	A	T	I	D	G	S	M	C	A	T	I	D	G	S	M	C	DL	A	D	S	M	C
Nickelocene																																							
_1																																							
Nickel potassium cyanide																																							
+1																																							

A, aneuploidy; C, chromosomal aberrations; D, DNA damage; DL, dominant lethal mutation; G, gene mutation; I, inhibition of intercellular communication; M, micronuclei; R, mitotic recombination and gene conversion; S, sister chromatid exchange; T, cell transformation

In completing the tables, the following symbols indicate the consensus of the Working Group with regard to the results for each endpoint:

- + considered to be positive for the specific endpoint and level of biological complexity
- +¹ considered to be positive, but only one valid study was available to the Working Group
- considered to be negative
- ¹ considered to be negative, but only one valid study was available to the Working Group
- ? considered to be equivocal or inconclusive (e.g., there were contradictory results from different laboratories; there were confounding exposures; the results were equivocal)

^aNegative result in one study for unscheduled DNA synthesis

^bNegative result in one study for gene mutation to ouabain resistance in Syrian hamster embryo cells

^cNegative result in one study for differential toxicity in *Escherichia coli*

Summary table of genetic and related effects of welding fumes

Nonmammalian systems													Mammalian systems																											
Proka-ryotes		Lower eukaryotes				Plants			Insects				In vitro														In vivo													
D	G	D	R	G	A	D	G	C	R	G	C	A	Animal cells								Human cells								Animals							Humans				
													D	G	S	M	C	A	T	I	D	G	S	M	C	A	T	I	D	G	S	M	C	DL	A	D	S	M	C	A
Welding fumes from mild steel																																								
MIG																																								
- ¹	-															- ¹		- ¹														- ¹		-						
MMA																																								
- ¹	+															+ ¹		- ¹													- ¹		-							
Welding fumes from stainless steel																																								
MIG																																								
- ¹	+															+		+		+ ¹											- ¹		-				? - ¹ ?			
MMA																																								
+ ¹	+															?	+	+		+ ¹											+ ¹	- ¹	-							
Welding fumes from mild steel or cast iron with nickel-rich electrode																																								
- ¹																- ¹		- ¹							+ ¹						- ¹		-							

A, aneuploidy; C, chromosomal aberrations; D, DNA damage; DL, dominant lethal mutation; G, gene mutation; I, inhibition of intercellular communication; M, micronuclei; R, mitotic recombination and gene conversion; S, sister chromatid exchange; T, cell transformation

In completing the tables, the following symbols indicate the consensus of the Working Group with regard to the results for each endpoint:

- + considered to be positive for the specific endpoint and level of biological complexity
+¹ considered to be positive, but only one valid study was available to the Working Group
- considered to be negative
-¹ considered to be negative, but only one valid study was available to the Working Group
? considered to be equivocal or inconclusive (e.g., there were contradictory results from different laboratories; there were confounding exposures; the results were equivocal)