



TOXICOLOGICAL REVIEW

OF

ACROLEIN

(CAS No. 107-02-8)

**In Support of Summary Information on the
Integrated Risk Information System (IRIS)**

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US Environmental Protection Agency
Washington, DC

TABLE 2. Effects of Inhaled Acrolein on Laboratory Animals

Species	Exposure Duration	Concentration (ppm)	Principal Effects	Reference
Rat				
Wister, male	6 h/day for 3 days	0, 0.25, 0.67, and 1.4	Nasal necrosis of respiratory epithelium and increased proliferation up to 0.67 ppm; 1.4 ppm group not evaluated.	Cassee et al. (1996b)
S-D, male	6 h/day 5 days/wk for 3 weeks	0, 0.1, 1.0, and 3.0	No effect on macrophage killing of inhaled <i>K. pneumonia</i> .	Sherwood et al. (1986)
S-D, male	6 h/day 5 days/wk for 3 weeks	0, 0.1, 1.0, and 3.0	Nasal exfoliation, erosion necrosis of respiratory epithelium and squamous metaplasia at 3 ppm; no effects on lungs or in local pulmonary antibody responsiveness to <i>L. monocytogenes</i> .	Leach et al. (1987)
F-344, male	6 h/day 5 days/wk 62 days (except for weekends for 12.4 weeks)	0, 0.4, 1.4, and 4.0	<ol style="list-style-type: none"> 1. High mortality at 4 ppm. 2. Increase in lung collagen at 1.4 and 4 ppm (p<0.05). 3. Elastin content in 4 ppm group twice controls. 4. Bronchial necrosis and pulmonary edema at 4 ppm. 5. Parenchymal restriction at 0.4 ppm and obstructive lesions at 4.0 ppm. 6. No cytogenic or sperm abnormalities 	Kutzman (1981); Kutzman et al. (1985); Costa et al. (1986)
Dahl, female (selected for susceptibility or resistance to salt-induced hypertension)	6 h/day 5 days/wk for 61-63 days (excluding weekends for 12.4 weeks)	0, 0.4, 1.4, and 4.0	<ol style="list-style-type: none"> 1. All susceptible 4 ppm rats died after 11 days and 60% of resistant rats survived to end of study. 2. Lungs of susceptible rats had severe airway necrosis with edema and hemorrhage but only proliferative changes with resistant rats. 3. No differences in histopath between rat groups at lower doses. 4. No effect of exposure on blood pressure changes. 	Kutzman et al. (1984, 1986)
SPF-OFA, male	Not explicitly stated, but up to 77 days	0, 0.55	<ol style="list-style-type: none"> 1. Decrease in alveolar macrophage. 2. No effects on reproductive potential. 	Bouley et al. (1975, 1976)
S-D, male	7 h/day for 3 consecutive days	1.7	<ol style="list-style-type: none"> 1. Olfactory degeneration in all exposed rats. 2. Ulceration of respiratory epithelium in 4/10. 	Teredesai and Stinn (1989)

Species	Exposure Duration	Concentration (ppm)	Principal Effects	Reference
S-D, male	6 h/day for 1 or 3 days	0, 0.2, and 0.6	Proliferative nasal and tracheal cells in epithelia at both concentrations.	Roemer et al. (1993)
Mouse				
Swiss-Webster, male	6 h/day for 5 days	1.7	1. Lesions of moderate severity in respiratory epithelium except for severe squamous metaplasia. 2. Lesions (ulceration and necrosis) of moderate severity in olfactory epithelium with squamous metaplasia mild. 3. Incomplete recovery after 72 hours.	Buckley et al. (1984)
Swiss, female	4 h/day for 4 days	2.5	Coexposure to acrolein and carbon black increased pulmonary killing of <i>P. mirabilis</i> and impaired elimination of <i>L. monocytogenes</i> . Killing of <i>S. aureus</i> was suppressed on first post-exposure day, but returned to normal on seventh day.	Jakab (1993)
CDI, female	3 h/day for 5 consecutive days	0.1	Decreased ($p < 0.01$) in percent killing of <i>S. zooepidemicus</i> and <i>K. pneumonia</i> .	Aranyi et al. (1986)
White albino, male	6 h/day, for one 5-day period or 6h/day for two 5-day periods	various	1. Lung lesions (but no mortality) in mice exposed for two 5-day periods (concentration unknown). 2. LC_{50} of 66 ppm in group exposed for 6 hours. 3. 91% mortality in mice exposed to 50 ppm for 5 days.	Philippin et al. (1970)
FVB/N, male	6 h/day 5 days/wk for 3 weeks	3.0	Acrolein-induced excessive macrophage accumulation was associated with mucus hypersecretion.	Borchers et al. (1999b)
Guinea Pig, Rabbit				
Guinea pigs	7.5 h/day 2 consecutive days	1.6	1. Pulmonary inflammation. 2. Prolonged increase in airway sensitivity to substance P.	Turner et al. (1993)
Rabbits, New Zealand, female	15 min	375 and 489	1. Mortality at both concentrations. 2. Extensive lung damage at both concentrations.	Beeley et al. (1986)

