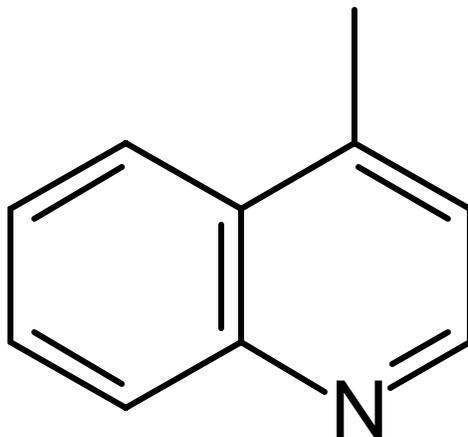


# 4-Methylquinoline (4-MeQ)



**Molecular Weight: 143.19**

**CAS Reg. No.: 491-35-0**



# 4-Methylquinoline Use/Occurrence

- **No known uses**
- **Environmental contaminant**
- **Associated with:**
  - Shale oil and coal gasification
  - Wood treatment
  - Tobacco smoke
  - Urban particulate matter



# Carcinogenicity of 4-MeQ

- **Carcinogenicity in humans:**
  - No data
- **Carcinogenicity in experimental animals:**
  - Intraperitoneal injection studies in mice (LaVoie *et al.*, 1988)
  - Subcutaneous injection studies in rats (LaVoie *et al.*, 1988)



# Tumors in Mice (LaVoie *et al.*, 1988)

Newborn CD-1 mice injected 3 times intraperitoneally

Treatment	Sex	Liver tumors			Lung tumors
		Total	Adenomas	Hepatomas	
4-MeQ	Male	23/28 *	20/28 *	3/28	2/28
	Female	0/29	0/29	0/29	2/29
Control (DMSO)	Male	4/21	0/21	0/21	0/21
	Female	0/21	0/21	0/21	0/21

\* Significant increase over controls ( $p < 0.0001$ ).



# Tumors in Rats (LaVoie *et al.*, 1988)

Newborn Sprague-Dawley rats injected subcutaneously

Treatment	Sex	Liver tumors		
		Total	Adenomas	Hepatomas
4-MeQ	Male	1/26	0/26	1/26
	Female	2/20	2/20	0/20
Control (DMSO)	Male	5/27	3/37	2/27
	Female	1/22	1/22	0/22



# Mouse Dermal Initiation/Promotion Studies (LaVoie *et al.*, 1983 & 1984)

## Skin tumor incidence in SENCAR mice treated dermally

Study	Initiating Dose of 4-MeQ	Promoting Dose of TPA	Evaluation Period (following promotion)	Skin Tumor Incidence
LaVoie et al., 1983	5 mg	150 µg over 20 wk	20 wk	11/25 *
	0	150 µg over 20 wk	20 wk	1/24
LaVoie et al., 1984	7.5 mg	72 µg over 18 wk	18 wk	13/29 *
	0	72 µg over 18 wk	18 wk	3/39

\* Significantly increased relative to controls (p<0.05)



# Genotoxicity of 4-MeQ

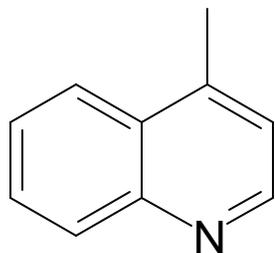
- **Bacterial assays**

- Consistently positive in *Salmonella* reverse mutation assays in the presence of metabolic activation
- Single report of a positive forward mutation assay in *Salmonella*
- Induction of unscheduled DNA synthesis in rat hepatocytes



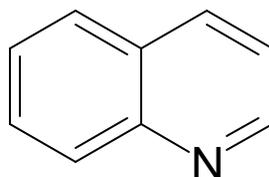
# Structure-Activity Comparisons

**4-Methylquinoline**



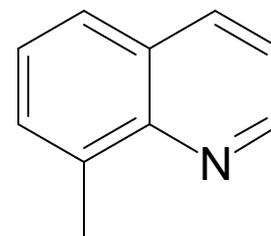
Liver tumors  
Initiating activity

**Quinoline**



Vascular tumors (liver)  
Liver tumors  
Initiating activity

**8-Methylquinoline**



Liver tumors  
Initiating activity



# 4-MeQ: Summary

- **Animal evidence of carcinogenicity:**
  - Induction of liver tumors in male mice following intraperitoneal injection
- **Other relevant evidence:**
  - Initiation activity in initiation/promotion studies
  - Genotoxicity
  - Structure-activity analogies

