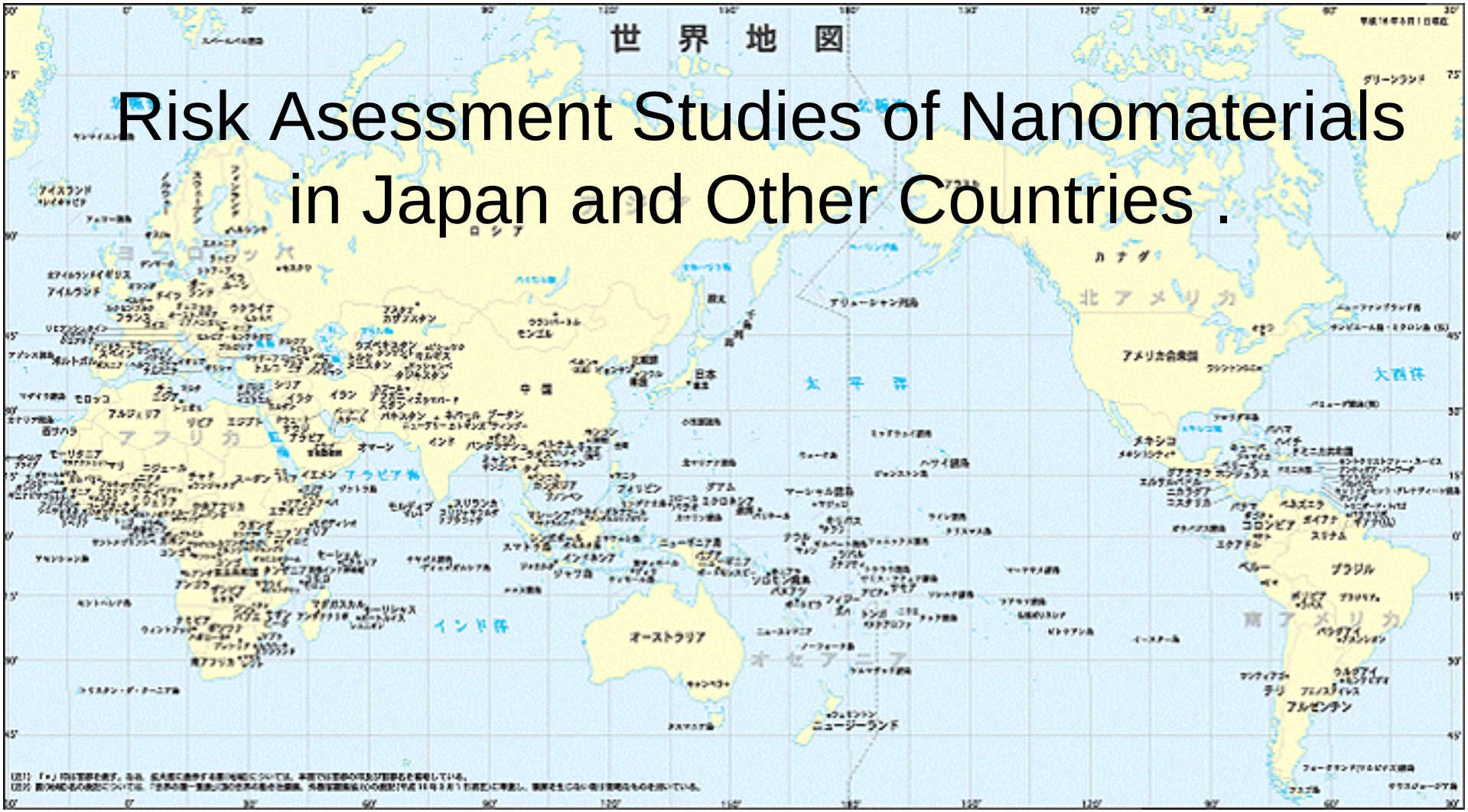
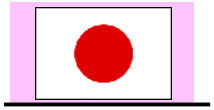
Risk Asessment Studies of Nanomaterials in Japan and Other Countries .



Dept. Molecular. Toxicol., NCU. Graduate Sch. Med. Sci.

Nanotoxicology Studies Worldwide
(Total 72 studies)

									Others[a]	
	vit[b]	vivo[c]	vit[b]	vivo[c]	vit[b]	vivo[c]	vit[b]	vivo[c]	vit[b]	vivo[c]
TiO_2		1[d]		3		3		5		2
Co, Zn, Ni		1[d]		1				1		
Mix. & Others				4		2		2	2	
Ultra fine carbon black				2		3				
SWCNT						1	3	4		2
Other CNT							1			
C60/70	5	3			1		1	5[e]	1	1
C60 deliv's		1			1		1		1	4

[a] Poland, India and Taiwan
[b] in vitro (cell) study
[c] in vivo (animal) study
[d] In collaboration with Dr. Donaldson
[e] Fish studies

(Mainly search from Pubmed)

Dept. Molecular. Toxicol., NCU. Graduate Sch. Med. Sci.

Nanotoxicology Organ Site Studies

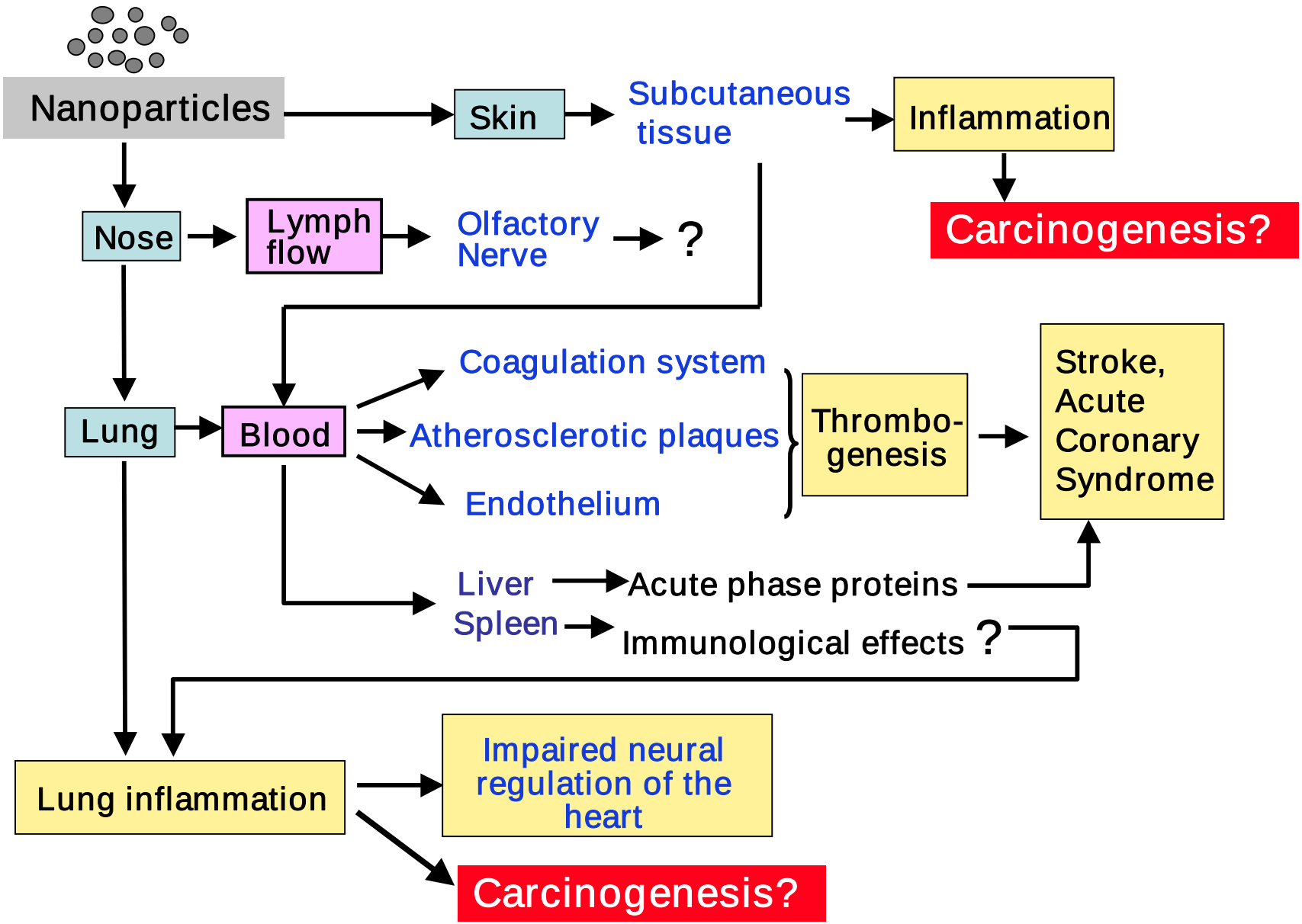
	Resp	Skin	CNS	OD	Resp	Skin	CNS	OD
TiO_2	1				3	1		
Other metals[a]	1				5			1
SWCNT								
C60 & deliv's		1		2				

	Resp	Skin	CNS	OD	Resp	Skin	CNS	OD
TiO_2		3			7			
Othe metals[a]			1	1	2			
SWCNT				1	4	1		
C60 & deliv's						1		3

Resp, Lung and respiratory tract
OD, Organ distribution study
[a], Including mixtures

Risk Assessment Studies of Nanomaterials (NM) in Japan

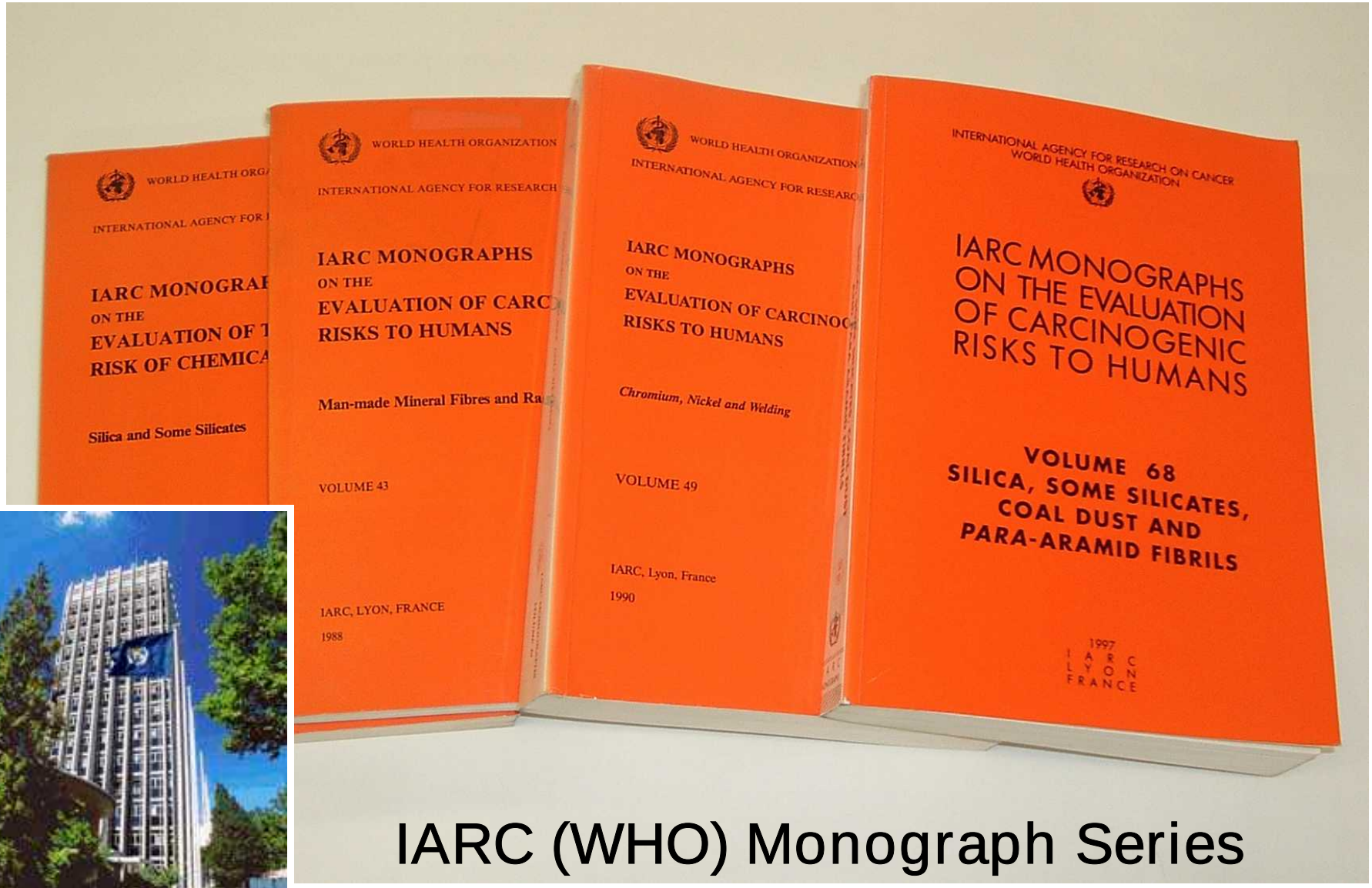
NM	Method	Results	Refs.
TiO_2	In vitro, UV	DNA, RNA damage	Hidaka, 1997
C60/C70 & delivs.	Skin painting +UVA, x3/w for 20w (toluene)	Skin erythema, but no tumor development	Moriguchi, 1999
	C60+PVP, i.p. d10 pregnant mouse	Multiple developmental anomaly, incl. CNS (LOAEL, 25mg/kg)	Tsuchiya, 1996
	C60-PEG, i.v. to s.c. tumor +light	Dose related anti-tumor effects by singlet O	Tabata, 1997
	In vivo/vitro	Inhibition of rabbit aorta relaxation	Satoh, 2001
	In vitro, light	Anti-tumor effects by singlet O	Yamakoshi, 1999
	NIH3T3 clone + light	Cell killing and transformation	Sakai, 1999



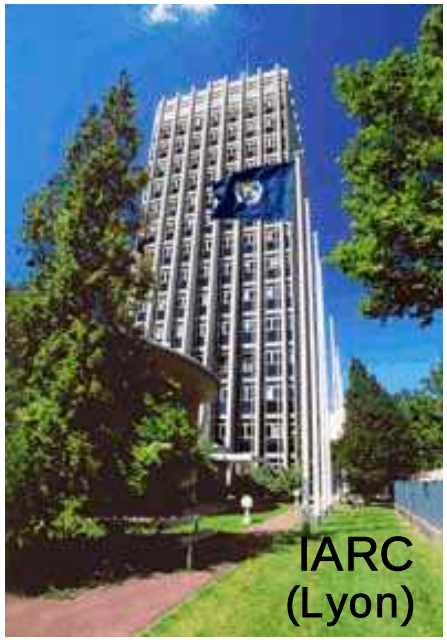
Toxicology of Nanomaterials

From Dr. Donaldson, modified

Dept. Molecular. Toxicol., NCU. Graduate Sch. Med. Sci.



IARC (WHO) Monograph Series



IARC Evaluation for Metals and Fibers

Group 1 Carcinogenic to humans	Group 2 Group 2A Probably carcinogenic to humans	Group 2 Group 2B Possibly carcinogenic to humans
Asbestos (264)[a] Cadmium (442) Chromium (861) Erionite (64) Nickel cpd. (81) Silica (638) Talc (401) Soots (262) Coal gasification (74) Iron founding (121)	Diesel engine exhaust (512/2) Lead cpd.(α) [b] Cobalt (α) [b]	Carbon black (238) Nickel (495) Gasoline engine exhaust (512/2) Welding humes (338)

Nanomaterials, 72

Metals and fibers, 5429+α !

[a] Number of references (peer reviewed papers) cited, total 5429
[b] in press

Herald Tribune, Japan, July 3rd-8th, 2005

STAFF WORKED WITH INSULATION

Nichias links 141 dead to asbestos

Compiled from AP, Kyodo

Insulation materials maker Nichias Corp. said Tuesday that 141 employees, mostly plant and construction workers, have died over the last three decades after developing cancer and lung disease probably caused by the company's production of asbestos insulation.

The Nichias employees who died of methothelioma — a deadly asbestos-related cancer — as well as pneumoconiosis were employed at five factories and other construction sites where sealing materials, thermal insulation and other building materials are made, company spokesman Ikuo Kawamura said.

The company's disclosure comes only days after major industrial equipment maker Kubota Corp. revealed that 79 of its employees died of illnesses caused by asbestos produced at its plants.

According to Nichias, 100 plant workers and 41 construction workers died between 1976 and 2004, and 24 others are currently being treated for illnesses linked to asbestos.

The 100 workers were hi at Nichias' plants in Chiyo wa, Ibaraki Prefecture; T rumi, Kanagawa Prefectu Fukuroi, Shizuoka Pref ture; Hashima, Gifu Pre ture; and Oji, Nara Pre ture; when they were mak asbestos products.

Asbestos was widely use Japan in buildings as ins tion and in roof tiles until 1980s, and the government ficially banned the shipm or production of asbestos c last year.

Nichias used the mate from 1937 through last ye

The deaths and illnesses curred among workers were exposed to certain de ly types of asbestos that w banned by the company in 1972.

No illnesses or deaths have been reported among workers who joined the company after that year, Nichias said.

Last month, Kubota said 79 employees died of diseases believed to be related to asbestos between fiscal 1978 and 2004. Most of them worked at its asbestos prod-

Asbestos death tally hits 280

More firms step forward to reveal worker fatalities

Kyodo News

The number of workers reported by companies to have died from asbestos-related lung diseases rose Wednesday to 280 following revelations of 31 more deaths at six companies.

At Taiheiyo Cement Corp., 16 employees died of mesothelioma and other diseases between 1973 and 2004. They worked at factories that made construction materials using asbestos.

At Mitsubishi Materials Kenzai Corp., one employee died of pneumoconiosis in 1993 and another worker of 2001. Both han- y admitted the worker who died in 1993 got pneumoconiosis due to asbestos.

Asahi Glass Co. said an employee at a cathode ray tube-manufacturing factory where he used protection gear containing asbestos died of mesothelioma.

But the company reckoned the causal relationship between the death and the work environment is unclear.

Nozawa Corp., a Kobe-based construction material maker, and Japan Insulation Co., an Osaka-based c struction terial maker, ployee

have died of pneumoconiosis at a company that manufactured products for use by Japan Insulation.

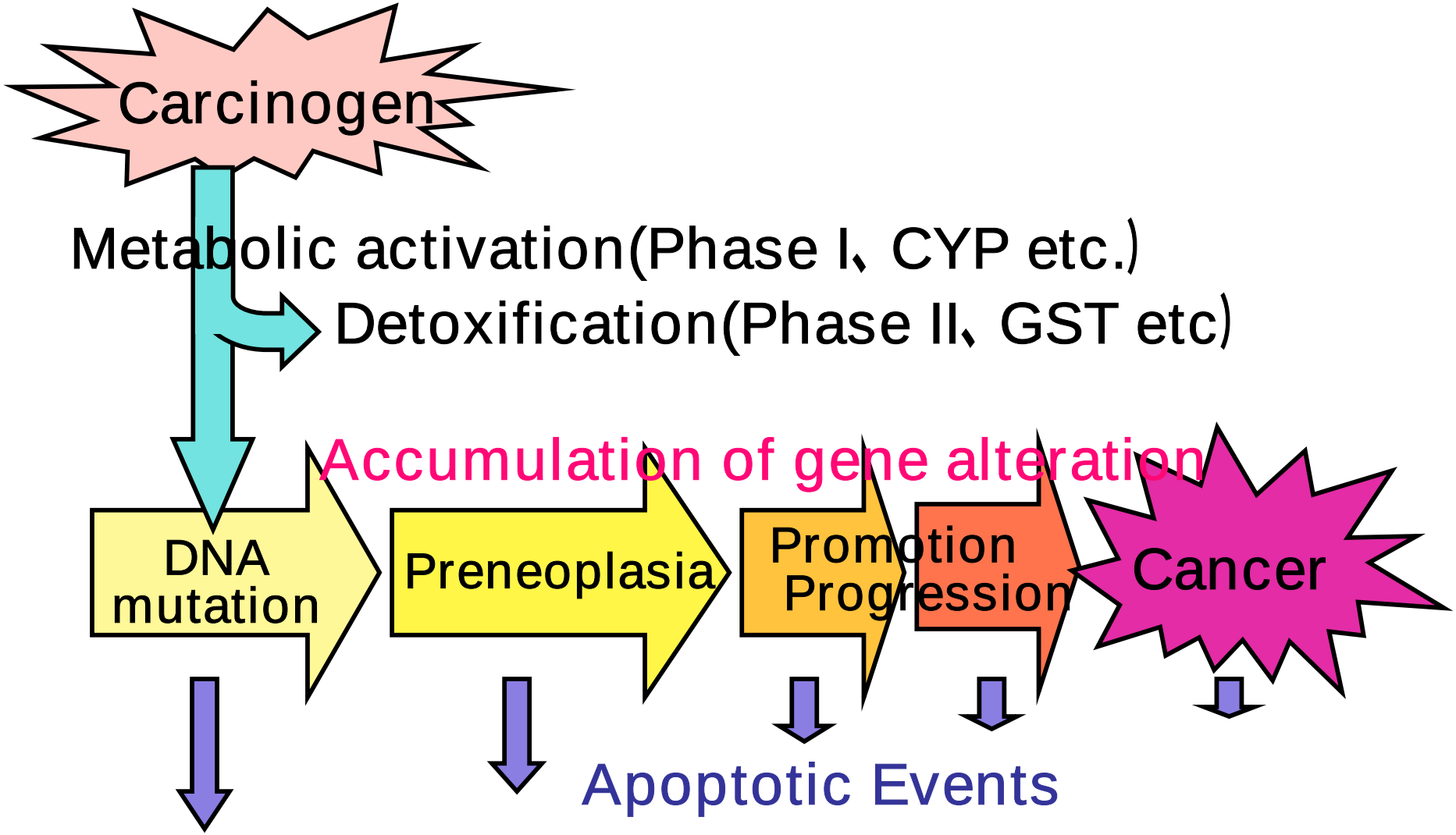
Prior to the fresh disclosures Wednesday, 249 employees at four companies were reported over the past week to have died from asbestos-linked lung diseases.

The four companies are machinery maker Kubota Corp. and three building materials makers — Nichias Corp., A&A Material Corp., subsidiary of Ube In- Associ- y asked 24 to in- lth prob- asbestos.

Evaluated as Group 1 in 1977

Time bomb exploded after 30 years!

Dept. Molecular. Toxicol., NCU. Graduate Sch. Med. Sci.



Cancer Development Takes a Long Time

Summary

Data available is insufficient for risk evaluation; especially carcinogenicity data from animal studies.

Because of limitation of;

1. Supply of test materials.
2. Facilities to conduct chronic toxicity studies.
4. Methods for administration (vehicle).
3. In vivo detection methods for NMs.

Conclusions

1. Known findings can be applied to NMs, i.e., metal and foreign body toxicology and epidemiology.
2. However, followings are indispensable
   - Financial support with good strategic vision for in vivo studies
   - Interdisciplinary collaboration
   - International collaboration

名古屋市立大学
Nagoya City University

Hospital

Depertment of
Molecular Toxicology