Research Methods Used to Study Malignant Tumor Formation

IN VITRO STUDIES: Study of human tissue and cells maintained outside the body



NORMAL PLEURAL MESOTHELIAL CELLS



Research Methods Used to Study Malignant Tumor Formation

IN VITRO STUDIES: Study of human tissue and cells maintained outside the body



Research Methods Used to Study Malignant Tumor Formation

IN VIVO STUDIES: Study of cells implanted in rodents



Characteristics of Asbestos Fibers that Promote Tumor Growth

CROCIDOLITE ASBESTOS



CHARACTERISTICS:

Characteristics of Asbestos Fibers that Promote Tumor Growth

CROCIDOLITE ASBESTOS



CHARACTERISTICS:

- Geometry/Shape
 - Long, thin
- Crystallinity/Habit
- Surface Chemistry
 - Iron (Fe)

Characteristics of Asbestos Fibers that Promote Tumor Growth

CROCIDOLITE ASBESTOS



<u>CHARACTERISTICS:</u> Geometry/Shape

- Long, thin
- Crystallinity/Habit_

BIOPERSISTENCE

(Durability in the Lung)

- Surface Chemistry
 - Iron (Fe)

Asbestos Fibers vs Non-Fibrous (Non-Asbestos Particles)



ASBESTOS FIBERS



ASBESTOS FIBERS ENTER THE LUNGS THROUGH INHALATION



ASBESTOS FIBERS ENTER THE LUNGS THROUGH INHALATION





THE BRONCHIAL TUBES CARRY ASBESTOS FIBERS TO THE ALVEOLI



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SOME ASBESTOS FIBERS ARE CARRIED AWAY BY THE LYMPHATIC SYSTEM



BUT SOME ASBESTOS FIBERS BECOME LODGED IN THE MESOTHELIAL CELLS OF THE PLEURAL CAVITY



BUT SOME ASBESTOS FIBERS BECOME LODGED IN THE MESOTHELIAL CELLS OF THE PLEURAL CAVITY











MESOTHELIAL CELLS REACT TO THE ASBESTOS FIBER AND BECOME ABNORMAL MALIGNANT MELANOMA



Cell/Tissue Response to Asbestos Fibers

ABNORMAL SQUAMOUS CELL



ABNORMAL TRACHEAL EPITHELIAL CELL



ABNORMAL SQUAMOUS CELL



Cell/Tissue Response to Asbestos Fibers



Research Regarding Non-Asbestos Particles

Riebeckite	- 1μ -
Antigorite	1μ-
Glass Beads	

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100

Research on Industrial Talc Containing Cleavage Fragments

NON-ASBESTOS PARTICLES IN INDUSTRIAL TALC



Three types of industrial talcs with different percentages of tremolite and anthophyllite cleavage fragments (non-asbestos particles):

Type 1

 - 35% tremolite
 - 15% serpentine

Type 2

 12% tremolite
 3% anthophyllite

• Type 3 - 4% tremolite

– 3% anthophyllite

NON-ASBESTOS PARTICLES (CLEAVAGE FRAGMENTS)



THE SIZE AND SHAPE OF NON-ASBESTOS PARTICLES INFLUENCES INHALATION AND MIGRATION INTO THE LUNGS



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NON-ASBESTOS PARTICLES THAT ARE GREATER THAN 10 MICRONS ARE TOO LARGE TO BE INHALED (NON-RESPIRABLE)



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NON-ASBESTOS PARTICLES THAT ARE 3 TO 6 MICRONS IN SIZE CAN MIGRATE TO THE BRONCHIAL TUBES





ONCE IN THE BRONCHIAL TUBES, PARTICLES 3 TO 6 MICRONS IN SIZE ARE CAPTURED BY CILIA AND EXPELLED WITH MUCUS THROUGH COUGHING





NON-ASBESTOS PARTICLES THAT ARE 1 TO 2 MICRONS IN SIZE CAN MIGRATE DEEP INTO THE LUNG





NON-ASBESTOS PARTICLES THAT ARE 1 TO 2 MICRONS IN SIZE CAN MIGRATE DEEP INTO THE LUNG





SOME OF THE NON-ASBESTOS PARTICLES WILL DRAIN FROM LYMPH NODES INTO LYMPHATIC SYSTEM













NON-ASBESTOS PARTICLES THAT REMAIN IN THE PLEURAL CAVITY DO NOT CAUSE A MESOTHELIAL CELL RESPONSE



Asbestos Fibers vs Non-Fibrous (Non-Asbestos Particles)

ASBESTOS FIBERS

TUMOR PROMOTION



NON-ASBESTOS PARTICLES

NO TUMOR PROMOTION



Cosmetic Talc Also Lacks Characteristics that Initiate Tumor Growth



No research or studies conducted, because talc is NOT indicated as a cause of disease.

Results of Dose-Response Research

There Is a Threshold Level of Asbestos Exposure Below Which No Disease Is Triggered

Addition of crocidolite asbestos to respiratory tract cells did not show harmful effects until the concentration reached a certain minimum level.

