INFLUENCE OF FIBER TYPE, SIZE AND EXPOSURE IN THE CANCER AND NON-CANCER RESPONSE TO ASBESTOS FIBERS (ANIMAL STUDIES)

Ernest E. McConnell, D.V.M., M.S. (Path), DACVP, DABT

ToxPath, Inc., Raleigh, NC

OVERVIEW – GENERAL PRINCIPLES

- **Asbestos fibers are not chemicals (from a toxicologist's viewpoint).**
- **Animals are reasonable surrogates for the study of asbestos.**
- **The pathobiology from asbestos exposure is a function of the physical and chemical properties of the fiber.**

ASBESTOS FIBERS ARE NOT CHEMICALS

- **The chemical components are not inherently toxic.**
- **There is no systemic toxicity.**
- **Asbestos fibers do not require metabolic activation to be toxic.**
- **There are no toxic metabolites.**

A COMPARISON OF DISEASES IN ANIMALS AND HUMANS ASSOCIATED WITH ASBESTOS EXPOSURE

DISEASE	ANIMAL	HUMAN
Pleural fibrosis		
Visceral	+	+
Parietal	+	+
Diffuse interstitial fibrosis	+	+
Cancer		
Nasal	--	--
Airway (Bronchial)	--	+
Lung (Carcinoma)	+	+
Pleural (Mesothelioma)	+	+
Peritoneum (Mesothelioma)	+	+
Gastrointestinal	±	±

THE PATHOBIOLOGY FROM ASBESTOS EXPOSURE IS A FUNCTION OF THE PHYSICAL AND CHEMICAL PROPERTIES OF THE FIBER

- **DOSE—"The dose makes the poison" (Paracelsus, 1541)**
- **DIMENSION – A fiber must be respirable to cause disease.**
- **DURABILITY (Biopersistence) – A fiber must reside in the lung for a sufficient period to cause disease.**
- **SURFACE ACTIVITY – Surface properties are important.**