Dosimetry Workshop
October 26, 2001
Room 41-235 CHS, School of Public Health
Southern California Particle Center and Supersite
UCLA

AGENDA

12 noon	*Moderator: Phalen*	**Working lunch** with presentation of the agenda and discussion of dosimetry efforts at other PM centers
1 pm	*Moderator: Nel*	**Brief presentations:**
	Sioutas	Supersite data on organic particle size distributions and concentrations
	Cho	PAH and quinone fractions in PM
	Hinds	Inhaled particle doses to major regions of the respiratory tract
	Phalen	Phenomena that produce higher than average doses
	Yu	Clearance kinetics for particle-associated organics
	Nel	Biological targets and biological amplification phenomena for organics
	Key Commentators:	**Focused Discussions:**
	Nel & Cho	What do we understand and what do we need to learn?
	Phalen, Hinds & Nel	What are the high priority tasks for the future?
	Phalen, Cho & Nel	What are the realistic action items and their timing?
	Phalen	How well have we done in this workshop?
5 pm		**Adjourn**

DOSIMETRY ACTIVITIES AND WORKSHOP REPORT

R. PHALEN

MOTIVATION:

1. INTREPRETATION OF CENTER RESEARCH PROJECTS

2. NRC COMMITTEE RSEARCH PRIORITIES

3. EAC's SUGGESTIONS REGARDING DOSIMETRY

ACTIVITIES

1. PERFORMING MORPHOMETRY FOR NORMAL & SENSITIZED BALB/C MICE & BROWN NORWAY RATS

2. PERFORMING STUDY OF TRANSFER EFFICIENCY OF 1 UM FLUORESCENT PSL FROM FREWAY STUDY CAGE INLET TO MICE LUNGS

3. CONDUCTED WORKSHOP TO ADDRESS PARTICLE DOSES IN IN-VITRO STUDIES AND SUSCEPTIBLE HUMAN POPULATIONS

4. VALIDATING PARTICLE DEPOSITION MODELS

5. PLANNING FUTURE WORKSHOPS

DOSIMETRY WORKSHOP AT UCLA, OCTOBER, 2001

GOAL: ASSIMILATE PARTICLE MEASUREMENTS AND EVALUAT THEIR DOSSIMETRIC IMPLICATIONS

BRIEF PRESENTATIONS:

CHO – PAH & QUINONE FRACTIONS IN PM

HINDS – INHALED PM DEPOSITION DOSES TO REGIONS OF THE RESPIRATORY TRACT

PHALEN – PHENOMENA THAT PRODUCE GREATER THAN AVERAGE DOSES

YU – CLEARANCE PHENOMENA FOR PM-ASSOCIATED ORGANICS

NELL – BIOLOGICAL TARGETS & AMPLIFICATION PHENOMENA

WORKSHOP RESULTS

LOCAL SURFACE DEPOSITION DOSES FOR THE MOST-HEAVILY EXPOSED 6 MILLION TB EPITHELIAL CELLS AT RIVERSIDE AND RUBIDOUX ARE IN & ABOVE THE RANGE OF DOSES ACTIVE IN DR. NELL'S IN-VITRO STUDIES

TYPICAL ASSUMPTIONS MADE:

1. COPD PRODUCES UNEVEN DEPOSITION IN THE TB REGION

2. DEPOSITION ENHANCEMENT AT BIFURCATIONS PRODUCES 81 TIMES THE AVERAGE SURFACE DOSE FOR THE 100 HEAVIEST-EXPOSED CELLS

3. CLEARANCE IS IMPAIRED FOR THESE CELLS OVER A ½ TO 1 DAY PERIOD

FOLD INCREASE IN DEPOSITED DOSE OF INHALED PARTICLES

- EXERCISE: REST = 1; SEDENTARY (READING) = 1.2; LIGHT (OFFICE WORK) = 2; MODERATE (WALKING) = 4; HEAVY (INDUSTRIAL) = 10
- MOUTH BREATHING: VERY PARTICLE SIZE DEPENDENT; FOR THORACIC DEPOSITION OF $PM_{2.5}$ = 4
- BODY SIZE; BRONCHIAL DEPOSITION EFFICIENCY FOR NEWBORN/ADULT FOR 5 μM PARTICLES = 2.4
- COPD: UNEVEN VENTILATION = 2.5
- LOCAL SURFACE DOSES: EASILY = 5-7, BUT CAN = 100
- NORMAL VARIATION: BASED ON METALS IN TISSUES AT AUTOPSY FOR TOP 1% OF POPULATION = 5-15
- PROXIMITY TO SOURCE: FOR PARTICLE NUMBER, 50M FROM SOURCE = 4 (ESTIMATE)
- ABNORMAL CLEARANCE: UNKNOWN, BUT COULD = 10 OR MORE