Lung Biology Research & Trainee Day
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Category: Staff/Tech/Other
Name: David Chalupa – Staff/Tech
PI: Alison Elder & Matthew McGraw
Title: Inhalation Core Facility: Electronic Cigarette Vapor Generation and Characterization in Support of Human Clinical, Animal, and In Vitro Environmental Health Effects Research
Abstract: The Environmental Health Sciences Center's Inhalation Exposure Facility (IEF) was established to focus the combined skills of biology, chemistry, and physics that are critical for inhalation toxicology research. More recently, the IEF has expanded its expertise to into research of electronic cigarettes (ecig) delivery, aerosolization and associated characterization in relation to human, translational and rodent exposures. Examples of model e-cig exposure systems used or developed with the IEF for rodent exposures include: 1) commercially available e-cig exposure system (inExposure, Scireq generator with 'mod' attachment, Montreal, CA) for nose-only and whole body animal exposures (1 hr exposures, average: 1215 mg/m3, 912 nm Mass Median Aerodynamic Diameter(MMAD), Geometric Standard Deviation (GSD) 1.6); 2) a custom three-pen continuous generation system (NYU/EAerosols, LLC, New York, NY) for sub-chronic inhalation exposures (3 hrs/day, 5 days/wk for 3 months, 50 mg/m3, 830 nm MMAD, 1.4 GSD); and 3) a variable-temperature, high-dose custom generator from Battelle Memorial Institute (1 hr exposures, 2280 mg/m3, 922 nm MMAD, GSD 1.8). We've employed real-time laser light scattering (Ras2, MIE Inc.) or Infrared (IR) (MIRAN, Foxboro, Inc.) to quantitate airborne ecig component concentrations. In translational analyses, we have assessed the performance of e-cig exposure in line with e-cig filter adaptors for the percent reduction in nicotine, PG/VG and other chemical components as well as their impact on the size distribution and mass of the aerosols. We have also implemented a topography system (eTop, American University of Beirut/Labview) in a one pass-ventilated room to assess human exposure to vaping aerosols. There are very few inhalation exposure facilities in the world with a unique focus of both human and animal characterization assessments. At Rochester, our strengths related to ultrafine and nanoparticles, aerosols, gases, and vapors are being expanded to the characterization and toxicological effects of vaping and e-cigarette aerosols.