Enhancing Effectiveness of Medical Equipment for Filtrating and Sterilizing Aerosol

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Surgical instruments must be thoroughly cleaned and disinfected after each usage. During the drying process, frequent usage of pressure air guns leads to bioaerosol generation, which can easily cause occupational exposure hazard and the spreading of respiratory diseases. Herein, I aim to develop a micron-level bioaerosol filtration device, so as to efficiently intercept and disinfect aerosol suspended particles even for particles larger than 0.3 μm. After repeated design and test optimization, a third-generation device (Microdevice to Intercept and Disinfect Aerosol Suspended particles; μIDAS) that can effectively filtrate and disinfect aerosols was developed. I carried out a normal drying process in two settings. Room A serves as a control, equipped with only the standardized pressured air guns, while Room B is equipped with the same standard, with the addition of μIDAS. I found that with the addition of this device, the average number of particles in the air was less than 1/L, which seen a dramatic decrease of more than 99.99% compared with the control. Herein, I prove that μIDAS can successfully filter and disinfect bioaerosol particles generated during the drying process, so that it can effectively reduce aerosol pollution, occupational hazard and prevent from the spread of respiratory diseases.

Awards Won: