

Assessment of clean laboratory conditions for contamination by DNA aerosols

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In parallel to the development of molecular biology techniques that enabled ultra-sensitive detection of DNA/RNA molecules, there has been a growing concern on the experimental contamination by exogenous molecules in experimental environments, which leads to false-positive results. In this study, we assessed DNA aerosols for the contamination risk and tested contaminant rejection capacity of air filter utilized for constructing clean experimental environment. The DNA aerosols-containing air was introduced into the Table KOACH (KOACH T 500, Koken, Ltd.) unit with FERENA (Super High-Performance Air) filter for assessing its capacity to trap and remove DNA aerosols. At downstream of the filter, detection of DNA molecules was greatly reduced and only detected at the highest exposure condition of DNA aerosols. The number of detected molecules at downstream of the filter was 0.039% of the detected molecules at upstream, which means that more than 99.96% of DNA-aerosols are trapped and removed by the FERENA filter. These results demonstrated that the number of aerosol formed in general molecular biology experiment are small and contamination by them can be avoided by the careful but basic procedure at laminar flow clean air condition.

Keywords: clean laboratory conditions, DNA aerosols, contaminant rejection capacity