

Type of cleanroom microorganisms and their origins

Origin	Occurrence rate of Contaminants		
	Gram positive bacteria	Gram negative bacteria	Fungi
Cleanroom surfaces	High	Low	Moderate
Cleanroom instruments/ equipment	High	High/Low	Moderate
Air	High	Low	Moderate
Water	Low	High	Less
People-gowns	High	Low	Moderate
Materials entered into the cleanroom	Variable	Variable	Variable
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The most commonly occurring fungal isolates and their sources

Air/surface	Personnel	Walls/floors	Water
Micrococcus lutes	Staphylococcus epidermidis	Bacillus spp.	Burkholderia cepacia
Micrococcus Lyle	Staphylococcus hominis	Staphylococcus spp.	Pseudomonas aeruginosa
Micrococcus spp.	Micrococcus app.	Burkholderia cepacia (in wet surfaces due to water spillage)	Pseudomonas fluorescens
Staphylococcus spp.	Corynebacterium spp.		Pseudomonas
Staphylococcus epidermidis	Propionibacterium spp.		Pseudomonas alcaligenes
Staphylococcus hominis	Clostridia, Bacillus spp.		Pseudomonas oryzae
Staphylococcus capitis	Acinetobacter spp.		Alcaligenes spp.
Staphylococcus Haemolyticus			Stenotrophomonas spp.
Bacillus spp.			Ralstonia picketti
Bacillus sphaericus			Acinetobacter lowffi
Bacillus Fusiformis			Serratia spp.
Bacillus cereus			Flavobacterium spp.
Falvimonas oryzae			Brevundimonas diminuta
Corynebacterium spp.			
Ochrobactrum anthropi			
Moraxella spp.			
Rhodococcus spp.			

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Reported common microbial contaminants in pharmaceutical environments using lipid analysis and DNA-based tests	
Name of the Gram-negative isolates	Name of the Gram-positive isolates
Ralstonia pickettii	Bacillus pumilus
Stenotrophomonas maltophila	Staphylococcus warneri
Enterobacter cancerogenous	Bacillus ciculans
Aeromonas hydrophila	Bacillus megaterium
Pantoea spp.	Bacillus amyloliquefaciens
Moraxella osloensis	Paenibacillus glucanolyticus
Stenotrophomonas spp.	Microbacterium spp.
Pseudomonas veronii	
Pseudomonas putida	
Pseudomonas stutzeri	
Yokenella regensburgei	
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The most commonly occurring fungal isolates and their sources

Air/surface	Personnel	Walls/floors	Water
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Cladosporium spp.	Pityrosporum ovale	Cladosporium spp.	Cladosporium spp.
Penicillium spp.	P. orbicular	Penicillium spp.	Penicillium spp.
Aspergillus spp.	Trichophyton*	Aspergillus spp.	Aspergillus spp.
Alternaria spp.	Epidermophyton*		
Curvularia spp.	Microsporon*		
Fusarium spp.			
*Dermatophytes present if people infected with skin diseases			
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