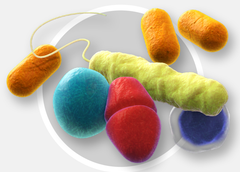
Respiratory Tract Infections

Why accurate detection and identification of pathogens is at the core of infection treatment.

ThermoFisher SCIENTIFIC

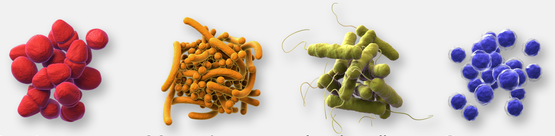
Pathogens

Bacteria

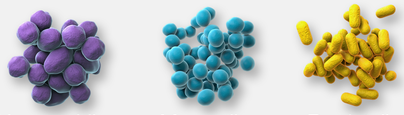


Bacteria are single-celled organisms that can reproduce on their own.

Common Species

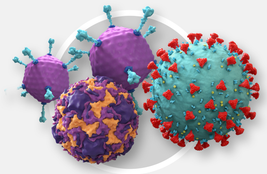


Streptococcus pneumoniae | Mycoplasma pneumoniae | Legionella pneumophila | Chlamydia pneumoniae



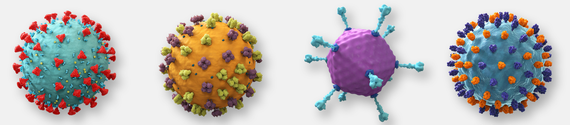
Haemophilus influenzae | Moraxella catarrhalis | Bordetella Pertussis

Viruses

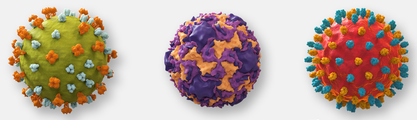


Viruses are composed of a protein coat and core genetic material.

Common Species



SARS-CoV-2 | Influenza | Adenovirus | Meta-pneumovirus



Parainfluenza | Rhinovirus | Respiratory Syncytial Virus

1) These lists aren't exhaustive. 2) There are other pathogens of respiratory tracts not shown, such as fungi and parasites.

Shared Symptoms

Bacterial & Viral overlap

Differentiating bacteria vs viral infection based on signs & symptoms alone can be challenging. Coughing and sneezing, fever, inflammation, vomiting, diarrhea, fatigue, and cramping can occur in various inferctions.

High-Risk Patient Conditions

Lung-related

- Asthma
- Bronchiectasis
- Bronchopulmonary dysplasia
- Chronic obstructive pulmonary disease (COPD)
- Damaged or scarred lung tissue (interstitial lung disease)
- Pulmonary embolism
- Pulmonary hypertension
- Tuberculosis

Others

- Cancer
- Chronic Kidney Disease
- Chronic Liver Disease
- Cystic Fibrosis
- Dementia or other neurological conditions
- Diabetes (type 1 or type 2)
- HIV infection
- Heart conditions
- Immunocompromised state (weakened immune system)
- Overweight and obesity
- Physical inactivity
- Sickle cell disease or thalassemia
- Solid organ or blood stem cell transplant
- Stroke or cerebrovascular disease

Patients with one or more of these conditions should be tested for more viruses than just COVID-19, flu, and RV.

Testing Methods

Culture

A patient sample is sent to a lab where experts encourage organisms in the sample to multiply. Then they examine to identify the pathogen.

Antigen (Rapid)

Nasal or throat swabs are mixed with liquid on a paper strip to return results within half an hour.

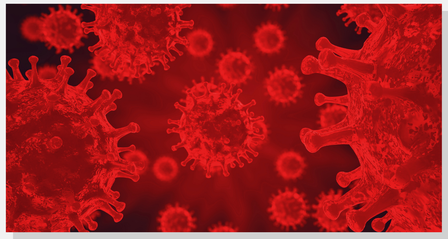
Molecular (PCR)

Genetic material from samples collected on swabs is amplified to detect genetic traces of a specific organism. Even in early stages of infection.

Benefits of Molecular Testing

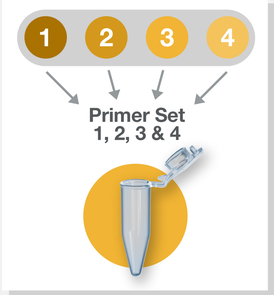
Diagnostic PCR testing

Diagnostic PCR (molecular) testing is considered the **gold standard** for pathogen detection and accuracy of results. The superior **sensitivity** of a molecular test can detect low pathogen loads. Molecular testing also has the benefit of **scalability**. Most lab-based PCR tests can accommodate 96 to 384 samples (including controls) simultaneously on a single plate.



Multiplex Testing

Multiplex Testing simultaneously differentiates respiratory diseases and helps identify cases of co-infection. Multiplex assay panels can go from two targets to dozens, making it an efficient technique.



The Opportunity

The experience of molecular testing during the COVID-19 pandemic has experts looking at using the technology in other **disease areas** that are subject of viral and bacterial infections.

Discover more educational content at **thermofisher.com/IDBlogs**

©2022 Thermo Fisher Scientific Inc. All rights reserved. All trademarks are the property of Thermo Fisher Scientific and its subsidiaries unless otherwise specified.