

# Laboratory diagnosis of candidiasis

by Real-Time PCR



## Fungi of the genus *Candida*

**Candidiasis** – inflammatory disease caused by excessive growth of yeast-like fungi of the genus *Candida*. Representatives of this genus are part of the normal microflora of a healthy person without any negative impact. They appear on the skin, mucous membrane of the oral cavity, gastrointestinal tract, urogenital tract. However, in the presence of predisposing factors, the active growth of fungi begins, giving rise to various disorders. Currently, more than 200 species of yeast of the genus *Candida* are known, of which about 20 species are etiological causative agents of human diseases.

### Features of the disease

- Candidiasis is characterized by a recurrent course of infection with frequent development of antibiotic resistance.
- Candidiasis can be differentiated into superficial candidiasis (inflammation of the skin, mucous membranes) and systemic candidiasis (inflammation of internal organs and systems).
- The most frequently occurring forms are oral candidiasis and urogenital candidiasis
- Systemic candidiasis is quite common in seriously ill patients and can be the cause of such conditions as lung abscesses, endocarditis, meningitis, sepsis.



of the world's population at least once in their life suffered from various forms of candida infection



women of childbearing potential have had a urogenital infection at least once in their lives

### Predisposing factors for the development of candidiasis



metabolic disorders, hypovitaminosis, diseases reducing the activity of the immune system (HIV infection, sexually transmitted infections, oncological diseases and others), diabetes



long-term intake of drugs: hormonal contraceptives, glucocorticosteroids, antibiotics, cytostatics



invasive methods of diagnosis and treatment, surgical interventions, stay in intensive care units

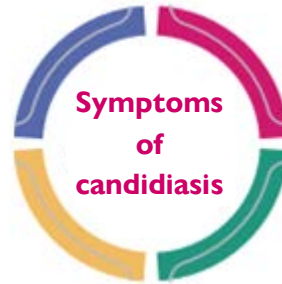


exposure to conditions contributing to excess yeast growth (warm and humid environment, tight underwear made of non-breathable materials, etc.)

## Manifestations of candidiasis depend on the localization of the outbreak of the disease

### Candidiasis of the gastrointestinal tract

- Pain when swallowing, burning sensation
- Nausea, vomiting, frequent belching



### Candidiasis of the oral mucosa

- Swelling of the oral mucosa, white curd-like coating on the tongue
- Burning in the mouth, dry mouth

### Urogenital candidiasis

- Burning and itching in the genital area, swelling and redness of the mucosa
- White "cottage cheese-like" discharge

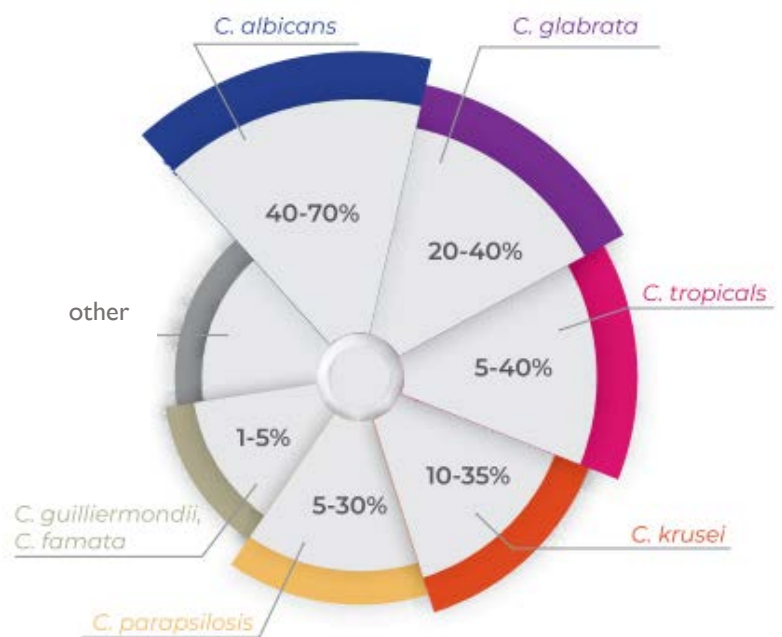
### Candidiasis of skin, nails and hair

- Redness of the nail fold, cracks, throbbing pain
- Rashes, itching, erosive lesions

## Candidiasis – it's not only *Candida albicans*

*Candida albicans* is dominant causative agent of the disease, but other *Candida* species, the so-called "non-albicans", are increasingly involved in pathogenesis: *Candida parapsilosis*, *Candida tropicalis*, *Candida glabrata*, *Candida krusei*, *Candida famata*, *Candida guilliermondii* and others. Based on the latest research, infection with strains of "non-albicans" has increased significantly among HIV-positive patients, postmenopausal women, and patients with uncontrolled diabetes.

*Candida* non-albicans species are the most common cause of the appearance of severe and recurrent forms of candidiasis insensitive to standard antifungal therapy, which requires a completely different approach to the treatment.



## Objectives of laboratory tests

- Confirmation of the diagnosis during clinical manifestations of infection
- Species identification of *Candida spp.* for selection of effective antifungal therapy
- Determination of the sensitivity of the genus *Candida* to antifungal drugs in case of recurrent disease and resistance to prescribed drugs

## Features and advantages of kits

- **Ready Master Mix for PCR:** just add extracted NA to the test tube and start the reaction
- **Multiplexity:** detection of two or more infectious markers in one tube
- **Number of tests:** 96 samples including control samples
- **Universal protocol**
- **Can be used with:** CFX96 (BioRad, USA), DTprime (DNA-Technology, Russia), Gentier 96E/R (Tianlong Science & Technology, China)
- **Storage and transport:** storage at a temperature of 2°C to 8°C for 1 year, transport at temperatures up to 26°C for max. 10 days

## Laboratory diagnosis of candidiasis



Microbiological methods



Bacteriological methods



Molecular biology methods

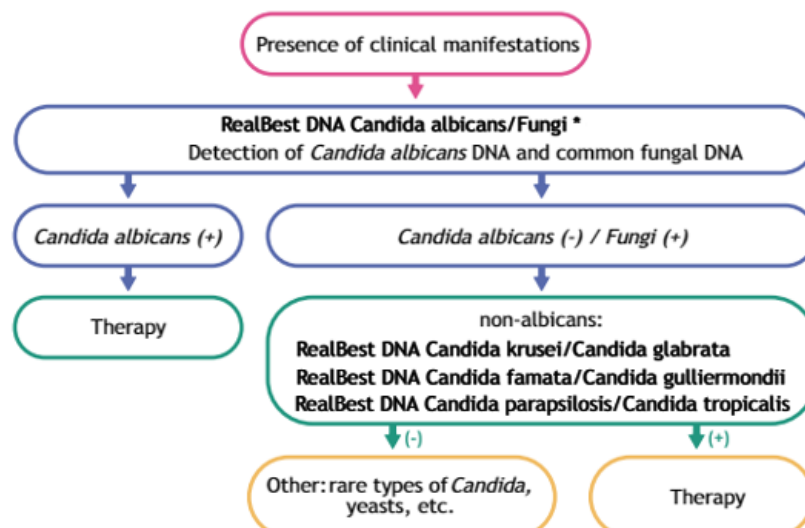
For the diagnosis of candidiasis, microbiological and bacteriological methods are applied, however, the latter have a number of limitations. Microscopic testing of a swab from the affected area of the mucosa does not always allow to detect the causative agent due to a possible change in the morphology of microscopic fungal cells. The use of bacteriological methods, in turn, is limited due to the lengthiness of testing.

Real-Time PCR method, which is characterized by its high sensitivity and specificity, allows you to quickly and operatively confirm the diagnosis and identify a particular genus of *Candida*.

*Candida spp.* is a representative of normal microflora, therefore, laboratory tests to establish a diagnosis should be carried out only in the presence of clinical manifestations. To determine adequate antifungal therapy, it is recommended to use complex laboratory diagnosis.



## Laboratory diagnosis of candidiasis using RealBest kits



\* Saccharomycetales, Eurotiales, Tremellales, Capnodiales, Malasseziales, Chaetothyriales, Pleosporales, Agaricales, Mucorales, Entomophthorales and other

## RealBest® Technology: solution for PCR diagnosis of candidiasis



### Biological specimen:

- Epithelial cell swabs
- Bronchoalveolar lavage
- Mucus
- Blood serum/plasma



### Preparation:

Manual: RealBest DNA-express  
 RealBest extraction 100  
 RealBest DNA-extraction 3  
 Automatic: UniMag



### Interpretation:

The interpretation of results is carried out automatically



### Amplification:

RealBest DNA Candida albicans  
 RealBest DNA Candida albicans/Fungi  
 RealBest DNA Candida krusei/Candida glabrata  
 RealBest DNA Candida famata/Candida guilliermondii  
 RealBest DNA Candida parapsilosis/Candida tropicalis



Cat. №	Kit Name	Number of tests
<b>Kits for nucleic acids extraction</b>		
8899	RealBest DNA - express	100
8896	RealBest extraction 100	48 (6x8)
8889	RealBest DNA-extraction 3 (variant 6x16)	96 (6x16)
8883	RealBest UniMag	96 (4x24)
8878	RealBest DNA-extraction 3 (variant 2x48)	96 (2x48)
<b>Validation of biological specimen sampling</b>		
8888 €	RealBest Sample Validation	96
<b>Kits for candidiasis detection</b>		
4698 €	RealBest DNA Candida albicans	96
0448 €	RealBest DNA Candida albicans/Fungi	96
0446 €	RealBest DNA Candida krusei/Candida glabrata	96
0442 €	RealBest DNA Candida famata/Candida guilliermondii	96
0440 €	RealBest DNA Candida parapsilosis/Candida tropicalis	96

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