

List of Diagnostic Services

FISHseq (FISH + 16S rRNA gene PCR/sequencing)

Molecular biological infection diagnostics



General information

MoKi Analytics GmbH and the practice Moter Diagnostics offer molecular biological infection diagnostics using fluorescence in situ hybridization (FISH) combined with PCR and sequencing (FISHseq, MG-FISH). Laboratory analysis and the generation of laboratory reports are performed by MoKi Analytics, while medical interpretation of the results and consultation are provided by the practice Moter Diagnostics.

FISHseq enables the direct detection and identification of microorganisms and biofilms within tissue sections. Combining FISH with microbiome analyses (microbiome-guided FISH, MG-FISH) allows for the simultaneous detection of all microbial species present in a sample.

All steps of the FISHseq analysis are carried out on working days. An initial FISH result is typically available one day after sample receipt. Initial sequencing results are completed on the second day following sample receipt. Specific FISHseq findings generally require two to five days.

MG-FISH is performed following prior consultation by telephone (+49 151 2204 7978).

Results are communicated in writing or electronically; in urgent cases or when results are relevant to therapy, communication takes place by telephone, including on Sundays and public holidays. Changes regarding sample material and the introduction of new analyses will be announced in a timely manner or incorporated into the updated service catalog.

Specimen Requirements

To ensure the best possible test results, samples should be shipped in FISH-fixative solution FISHopt® (MoKi Analytics GmbH, www.moki-analytics.com). Shipment of fixated samples can be done at ambient temperature. Consequently, the sample arrives at our laboratory already fixed and can be processed immediately.

Suitable specimens include, among others, heart valves and prostheses, vascular prostheses, explants, soft tissue, catheters, and other foreign bodies.

For unfixed material, transport at 4–10°C – for example packing together with a freezer pack - is recommended. In emergencies or for short transportation times, samples may be shipped in a small amount of sterile saline solution.

Each sample container must be clearly labeled. The analysis order form accompanying each sample must include the following information from the sender, in addition to patient-specific details such as first and last name, gender, and date of birth (plus full address for private patients):

- Clinical information (if available)
- Clear analysis request (specific test or indication)
- Date and time of sample collection
- Physician's signature

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FISHseq

- **Synonym**
Fluorescence in situ Hybridization (FISH) in combination with 16S rRNA gene PCR and sequencing
- **Specimens**
Specimens from normally sterile sites. Please contact us if you want to submit specimens from normally non-sterile sites.
- **Method**
FISHseq: Fluorescence in situ hybridization (FISH), 16S rRNA gene amplification with polymerase chain reaction (PCR) followed by Sanger sequencing.
- **Turnaround Time**
1 - 5 days
- **Reference range**
Positive / negative, planktonic / microcolonies / biofilm-staging, localization, activity, microbial species identification
- **Accreditation**
No
- **General Information**

FISHseq, the combination of FISH and PCR/Sanger sequencing, is used to identify bacteria and fungi through the molecular detection of rRNA and DNA. This combination allows for the morphological localization of microorganisms within tissue - including the assessment of their spatial organization (e.g., biofilms) and activity (based on rRNA signal intensity) - alongside their molecular identification. While particularly promising for tissues or explants from primarily sterile sites, the method is also applicable to mixed infections or device-associated infections (e.g., drivelines, urinary catheters, or dialysis catheters). Samples are embedded and thin sections are prepared. Using hybridization with fluorescence-labeled probes, microorganisms can be identified, localized, and quantified via fluorescence microscopy. The FISH signal intensity, by correlating with ribosome content, allows for a semi-quantitative assessment of microbial activity at the time of fixation.

In parallel, pathogens are identified using pan-bacterial 16S rRNA gene PCR and Sanger sequencing - with results compared to a reference database (SmartGene®) - and the findings are evaluated in conjunction with the FISH results.

FISH enables species identification even in cases of mixed infections, whereas the utility of Sanger sequencing may be limited by the presence of mixed sequences.

- **Indication**
Suspected infection by bacteria or fungi
- **Sampling and sample shipment**
Collection of the specimen (intraoperative tissue, implants/prostheses, devices) with minimal risk of contamination.

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Direct transfer into FISHopt® and transport to the laboratory as quickly as possible in accordance with UN 3373 regulations, accompanied by a completed submission form; if transport is delayed, storage at 4°C is optimal.

- **Assessment**

FISH: quantity of microorganisms, localization, spatial formation and activity of bacteria and fungi

PCR: positive, negative, inhibition

MG-FISH (microbiome-guided FISH)

- **Synonym**

- Fluorescence in situ Hybridization (FISH) in combination with 16S rRNA gene PCR and sequencing (next generation sequencing, microbiome analysis)

- **Specimens**

Specimens from normally sterile sites. Please contact us if you want to submit specimens from normally non-sterile sites.

- **Method**

MG-FISH: Fluorescence in situ hybridization (FISH), 16S rRNA gene amplification with polymerase chain reaction (PCR) followed by microbiome analysis.

- **Turnaround Time**

Usually 1 - 5 days

- **Reference range**

Positive / negative, planktonic / microcolonies / biofilm-staging, localization, activity, microbial species identification

- **Accreditation**

No

- **General Information**

MG-FISH – the combination of FISH and PCR/microbiome analysis - is used to identify bacteria and fungi through the molecular detection of rRNA and DNA. This approach is particularly promising in cases of suspected mixed infections in tissues or explants, or in device-related infections (e.g., drivelines, urinary catheters, or dialysis catheters). Samples are embedded and thin sections are prepared. Using hybridization with fluorescence-labeled probes, microorganisms can be identified, localized, and quantified via fluorescence microscopy. The FISH signal intensity - correlating with ribosomal content - allows for a semi-quantitative assessment of microbial activity at the time of fixation.

In parallel, pathogens are identified using pan-bacterial 16S rRNA gene microbiome analysis followed by comparison with a reference database (SmartGene®); these findings are then evaluated in conjunction with the FISH results.

This facilitates species identification and the selection of appropriate FISH probes, particularly in cases of mixed infections.

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Indication

Suspected infection by bacteria or fungi

- **Sampling and sample shipment**

Ideally, contamination-free sampling of the specimens (intraoperative tissue or device specimen, implants/prostheses)

Direct, intraoperative fixation of the samples in the FISH fixation solution FISHopt® (www.moki-analytics.com). Please pack and ship according to the requirements for Biological Substance, Category B (UN 3373). If shipping cannot take place immediately, please store at 4 °C (40 °F).

- **Assessment**

FISH: quantity of microorganisms, localization, spatial formation and activity of bacteria and fungi

PCR: positive, negative, inhibition

NGS: microbiome