

# In situ hybridization

## ZytoPure® FISH Probes



**ZYTO**MED  
SYSTEMS

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ZytoMed Systems is proud to offer the new product line **ZytoPure® FISH**, a reliable and accurate tool for the detection of genetic aberrations in FFPE tissue sections, cell samples and metaphase spreads by fluorescence *in situ* hybridization. **ZytoPure® FISH Probes** display brilliant signals, low background, and an excellent signal to noise

ratio. They are intended to be used in combination with the **ZytoPure® FISH Accessory Kit** comprising all reagents necessary for performing a FISH procedure on FFPE sections. The kit contains just 4 reagents and includes a robust and easy to follow protocol. All **ZytoPure® FISH Probes** as well as the **ZytoPure® FISH Accessory Kit** are CE/IVD-labelled.

### Background information

#### ► ERBB2/CEP17 ZytoPure® FISH Probe

The **ERBB2/CEP17 ZytoPure® FISH Probe** simultaneously determines the status of the ERBB2 gene and the centromeric alpha satellite sequences of chromosome 17. Amplification of ERBB2 is quite common in breast cancer (appr. 15% - 20%) and in gastric cancer [1, 2], and has been known for many years as a driver mutation [3]. Therefore, determi-

nation of the ERBB2 status is obligatory in these tumor entities. ERBB2 codes for a growth factor receptor which can be blocked efficiently by monoclonal antibodies or small molecules. Application of these drugs in breast cancer patients is one of the earliest examples for a targeted tumor therapy based on the patient's mutational status [4].

#### ► ZytoPure® FISH Probes for lung cancer

Rearrangements of receptor tyrosine kinases (RTK) ALK, ROS1, and RET determine clinically important molecular subgroups of non-small cell lung cancer (NSCLC). About 3% - 5% of all NSCLCs show an ALK rearrangement, and 1% - 2% show ROS1 or RET rearrangements [5]. In all fusion variants, the 3' TK domain is fused to the promotor regions and 5' coding regions of the fusion partner. Hence, rearranged RTKs are permanently active, sending proliferation signals into the cell, and thereby promoting

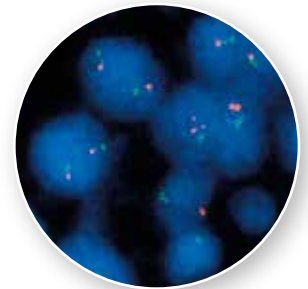
non-controlled cell growth. Several very efficient TK inhibitors (TKIs) were launched in recent years [6], and as a consequence the median survival of an ALK positive NSCLC patient treated with two ALK inhibitors is now more than 5 years [7]!

Amplification of the MET gene is the second most common resistance mechanism of lung adenocarcinomas against EGFR TKIs [8]. In addition, primary MET amplification is also found in a small percentage of treatment-naïve lung adenocarcinomas [9].

#### ► ZytoPure® FISH Probes for sarcomas

Numerous recurrent genomic rearrangements have been described in a number of bone and soft tissue tumors in the last 15 years [10, 11]. To give just a few examples, rearrangement of the USP6 gene occurs in the majority of primary aneurysmal bone cysts [12], and also in nodular fasciitis [13]. SS18 rearrangement is highly specific for synovial sarcomas [14], and the majority of

Ewing sarcomas is characterized by EWSR1 rearrangements [10]. Amplification of the MDM2 gene typically occurs in liposarcomas (but not lipomas) [15], and in certain osteosarcomas. In combination with histological and radiological findings, FISH-based detection of these rearrangements is a very important tool for the often complex differential diagnosis of these entities.



ERBB2/CEP17 ZytoPure® FISH Probe, breast cancer specimen with no amplification showing one to two orange (ERBB2) and green (CEP17) signals



ERBB2/CEP17 ZytoPure® FISH Probe, breast cancer specimen with massive amplification of ERBB2 (orange); chromosome 17 (green) shows a normal copy number



Human metaphases hybridized with the ERBB2/CEP17 ZytoPure® FISH Probe

# In situ hybridization

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## ► Product information

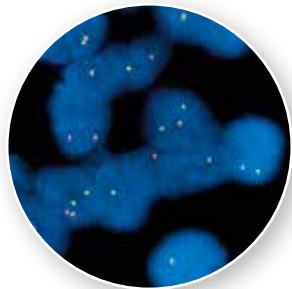
ZytoPure® FISH Probes

Description	Labeling	CE/IVD	Volume	Cat. No.
<b>ERBB2/CEP17 ZytoPure® FISH Probe</b>	orange/green	✓	20 µl	F2C001-002
			100 µl	F2C001-010
<b>ALK Break Apart ZytoPure® FISH Probe</b>	green/orange	✓	20 µl	F2C002-002
			100 µl	F2C002-010
<b>ROS1 Break Apart ZytoPure® FISH Probe</b>	orange/green	✓	20 µl	F2C003-002
			100 µl	F2C003-010
<b>RET Break Apart ZytoPure® FISH Probe</b>	orange/green	✓	20 µl	F2C004-002
			100 µl	F2C004-010
<b>MET/CEP7 ZytoPure® FISH Probe</b>	green/orange	✓	20 µl	F2C005-002
			100 µl	F2C005-010
<b>MDM2/CEP12 ZytoPure® FISH Probe</b>	green/orange	✓	20 µl	F2C006-002
			100 µl	F2C006-010
<b>USP6 Break Apart ZytoPure® FISH Probe</b>	green/orange	✓	20 µl	F2C007-002
			100 µl	F2C007-010
<b>EWSR1 Break Apart ZytoPure® FISH Probe</b>	orange/green	✓	20 µl	F2C008-002
			100 µl	F2C008-010
<b>SS18 Break Apart ZytoPure® FISH Probe</b>	orange/green	✓	20 µl	F2C009-002
			100 µl	F2C009-010
<b>FUS Break Apart ZytoPure® FISH Probe</b>	green/orange	✓	20 µl	F2C010-002
			100 µl	F2C010-010

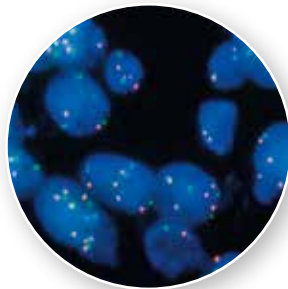
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## ► Literature

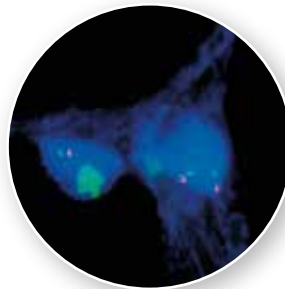
- [1] Bilou M *et al.* Breast Cancer Res Treat 134:617-624, 2012
- [2] Rüschoff J *et al.* Mod Pathol 25:637-650, 2012
- [3] Slamon DJ *et al.* Science 235:177-182, 1987
- [4] Albanell J, Baselga J Drugs Today (Barc.) 35:931-946, 1999
- [5] Thunnissen E *et al.* Virchows Arch 464:347-358, 2014
- [6] Ou SH *et al.* Oncologist 17:1351-1375, 2012
- [7] Duruisseaux M *et al.* Oncotarget 8:21903-21917, 2017
- [8] Savic S, Bubendorf L. Arch Pathol Lab Med 140:1323-1330, 2016
- [9] Schildhaus HU *et al.* Clin Cancer Res 21:907-915, 2015
- [10] Puls F *et al.* Histopathol 64:461-476, 2014
- [11] Vargas AC *et al.* Asia Pac J Clin Oncol 15:38-47, 2019
- [12] Oliveira AM *et al.* Am J Pathol 165:1773-1780, 2004
- [13] Erickson-Johnson MR *et al.* Lab Invest 91:1427-1433, 2011
- [14] Tanas MR *et al.* Arch Pathol Lab Med 134:1797-1803, 2010
- [15] Ware PL *et al.* Am J Clin Pathol 141:334-341, 2014



ALK Break Apart ZytoPure® FISH Probe, lung cancer specimen with ALK translocation, as indicated by single red signals in addition to fusion signals



MET/CEP7 ZytoPure FISH Probe®, lung carcinoma showing amplification of both MET and CEP7



MDM2/CEP12 ZytoPure® FISH Probe, liposarcoma showing amplification in left nucleus with large green MDM2 cluster; right nucleus displays normal copy number