

---

# Contents

<i>Preface to First Edition</i> .....	vii
<i>About the Editor</i> .....	xiii
Background .....	1
<i>Thomas Liehr and Anja Weise</i>	
PART I REQUIRED EQUIPMENT AND PROBES FOR FISH PROCEDURES	
Microscopy and Imaging .....	17
<i>Ivan T. Iourov</i>	
Optical Filters and Light Sources for FISH .....	27
<i>Michael Sommerauer, Ingrid Feuerbacher, and Alexander Krause</i>	
Classification of FISH Probes .....	43
<i>Thomas Liehr</i>	
Commercial FISH Probes .....	49
<i>Thomas Liehr</i>	
Generation of Paint Probes from Flow-Sorted and Microdissected Chromosomes .....	63
<i>Fengtang Yang, Vladimir Trifonov, Bee Ling Ng, Nadezda Kosyakova, and Nigel P. Carter</i>	
FISH-Microdissection .....	81
<i>Nadezda Kosyakova, Thomas Liehr, and Ahmed B. Hamid Al-Rikabi</i>	
Homemade Locus-Specific FISH Probes: Bacterial Artificial Chromosomes .....	101
<i>Thomas Liehr</i>	
PART II FISH PROCEDURE	
The Standard FISH Procedure .....	109
<i>Thomas Liehr, Katharina Kreskowski, Monika Ziegler, Katja Piaszinski, and Katharina Rittscher</i>	
Microwave Treatment for Better FISH Results in a Shorter Time .....	119
<i>Anja Weise and Thomas Liehr</i>	
FISH with and Without COT1 DNA .....	123
<i>Vladimir A. Trifonov, Nadezhda V. Vorobieva, Natalia A. Serdyukova, and Willem Rens</i>	
Formamide-Free Fluorescence In Situ Hybridization (FISH) .....	135
<i>Emanuela V. Volpi</i>	
One-Day Quick FISH .....	141
<i>Gábor Méhes, Tamás Csonka, and Katalin Hegyi</i>	
Telomere Length Measurement by FISH .....	147
<i>Gordana Joksic, Ivana Joksic, Jelena Filipović, and Thomas Liehr</i>	

RNA Imaging in Living Cells ..... 153  
*Bin Ma and Naoko Tanese*

The Replicative Detargeting FISH (ReD-FISH) Technique in Studies  
of Telomere Replication..... 159  
*Nikolay Rubtsov and Natalya Zhdanova*

PART III MATERIAL SUITED FOR FISH APPLICATIONS IN HUMANS

Pre- and Postnatal Diagnostics and Research on Peripheral Blood, Bone  
Marrow, Chorion, Amniocytes, and Fibroblasts ..... 171  
*Anja Weise and Thomas Liehr*

Application of FISH to Previously GTG-Banded and/or Embedded  
Cytogenetic Slides..... 181  
*Thomas Liehr and Monika Ziegler*

FISH in Uncultivated Amniocytes..... 185  
*Anja Weise, Monika Ziegler, and Thomas Liehr*

Tumorcytogenetic Diagnostics and Research on Blood and Bone Marrow  
Smears or Effusions..... 189  
*Eyad Alhourani, Moneeb A.K. Othman, Shaymaa S. Hussein Azawi,  
and Thomas Liehr*

Characterization of Mosaicism in Different Easy-to-Acquire Body Tissues  
Such As Buccal Smears, Skin Abrasions, Hair Root Cells, or Urine ..... 195  
*Thomas Liehr and Nadezda Kosyakova*

Characterization of Archived Formalin-Fixed/Paraffin-Embedded or Cryofixed  
Tissue, Including Nucleus Extraction ..... 201  
*Thomas Liehr*

FISH on Sperm, Spermatocytes and Oocytes ..... 209  
*Maria Oliver-Bonet*

PART IV MULTICOLOR-FISH-PROBE SETS (mFISH) AND IMMUNOSTAINING

Two- to Three-Color FISH ..... 227  
*Thomas Liehr, Sven Hauke, and Britta Meyer*

Multiplex FISH and Spectral Karyotyping ..... 233  
*Thomas Liehr and Nadezda Kosyakova*

FISH Banding Techniques ..... 241  
*Thomas Liehr, Nadezda Kosyakova, and Anja Weise*

cenM-FISH Approaches ..... 249  
*Thomas Liehr, Anja Weise, and Nadezda Kosyakova*

Heterochromatin-Directed mFISH (HCM-FISH) ..... 257  
*Thomas Liehr, Nadezda Kosyakova, Anja Weise, and Ahmed B. Hamid Al-Rikabi*

Subtelomeric and/or Subcentromeric Probe Sets..... 261  
*Anja Weise and Thomas Liehr*

Bar Coding Is Back..... 271  
*Thomas Liehr, Ahmed B. Hamid Al-Rikabi, and Anja Weise*

Fluorescence In Situ Hybridization onto DNA Fibres Generated Using Molecular Combing .....	275
<i>Sandra Louzada, Jun Komatsu, and Fengtang Yang</i>	
Parental Origin Determination FISH: Pod-FISH.....	295
<i>Anja Weise and Thomas Liehr</i>	
Simultaneous Fluorescence Immunostaining and FISH .....	301
<i>Christine J. Ye, Guo Liu, and Henry H.Q. Heng</i>	
RNA-Directed FISH and Immunostaining .....	327
<i>Bin Ma and Naoko Tanese</i>	
Immunofluorescence Staining for Cytosine Modifications Like 5-Methylcytosine and Its Oxidative Derivatives and FISH .....	337
<i>Anna A. Pendina, Olga A. Efimova, Andrei V. Tikhonov, Olga G. Chiryaeva, Irina D. Fedorova, Alla S. Koltsova, Mikhail I. Krapivin, Sergey E. Parfenyev, Tatyana V. Kuznetsova, and Vladislav S. Baranov</i>	
CENP Antibodies Used Additionally to FISH .....	347
<i>Elisabeth Klein and Thomas Liehr</i>	
PART V INTERPHASE FISH	
Interphase FISH in Diagnostics .....	355
<i>Thomas Liehr and Sven Hauke</i>	
Interphase FISH for Detection of Chromosomal Mosaicism.....	361
<i>Ivan Y. Iourov, Svetlana G. Vorsanova, and Yuri B. Yurov</i>	
Comet-FISH .....	373
<i>Galina Hovhannisyan and Rouben Aroutiounian</i>	
Micronucleus FISH.....	379
<i>Galina Hovhannisyan, Tigran Harutyunyan, and Thomas Liehr</i>	
Three-Dimensional Interphase Analysis Enabled by Suspension FISH .....	385
<i>Thomas Liehr and Nadezda Kosyakova</i>	
PART VI APPLICATIONS OF FISH IN ZOOLOGY, BOTANY AND MICROBIOLOGY	
Animal Probes and ZOO-FISH .....	395
<i>Fengtang Yang and Alexander S. Graphodatsky</i>	
Three-Dimensional Immunofluorescence In Situ Hybridization in Preimplantation Mouse Embryos .....	417
<i>Tiphaine Aguirre-Lavin and Nathalie Beaujean</i>	
Fish-FISH: Molecular Cytogenetics in Fish Species .....	429
<i>Cassia Fernanda Yano, Luiz Antônio Carlos Bertollo, and Marcelo de Bello Cioffi</i>	
FISH in Lampbrush Chromosomes .....	445
<i>Anna Zlotina and Alla Krasikova</i>	
General Protocol of FISH for Insects .....	459
<i>Ana Paula Alves-Silva, Luísa Antônia Campos Barros, and Silvia das Graças Pompolo</i>	



<http://www.springer.com/978-3-662-52957-7>

Fluorescence In Situ Hybridization (FISH)

Application Guide

Liehr, Th. (Ed.)

2017, XIII, 606 p., Hardcover

ISBN: 978-3-662-52957-7