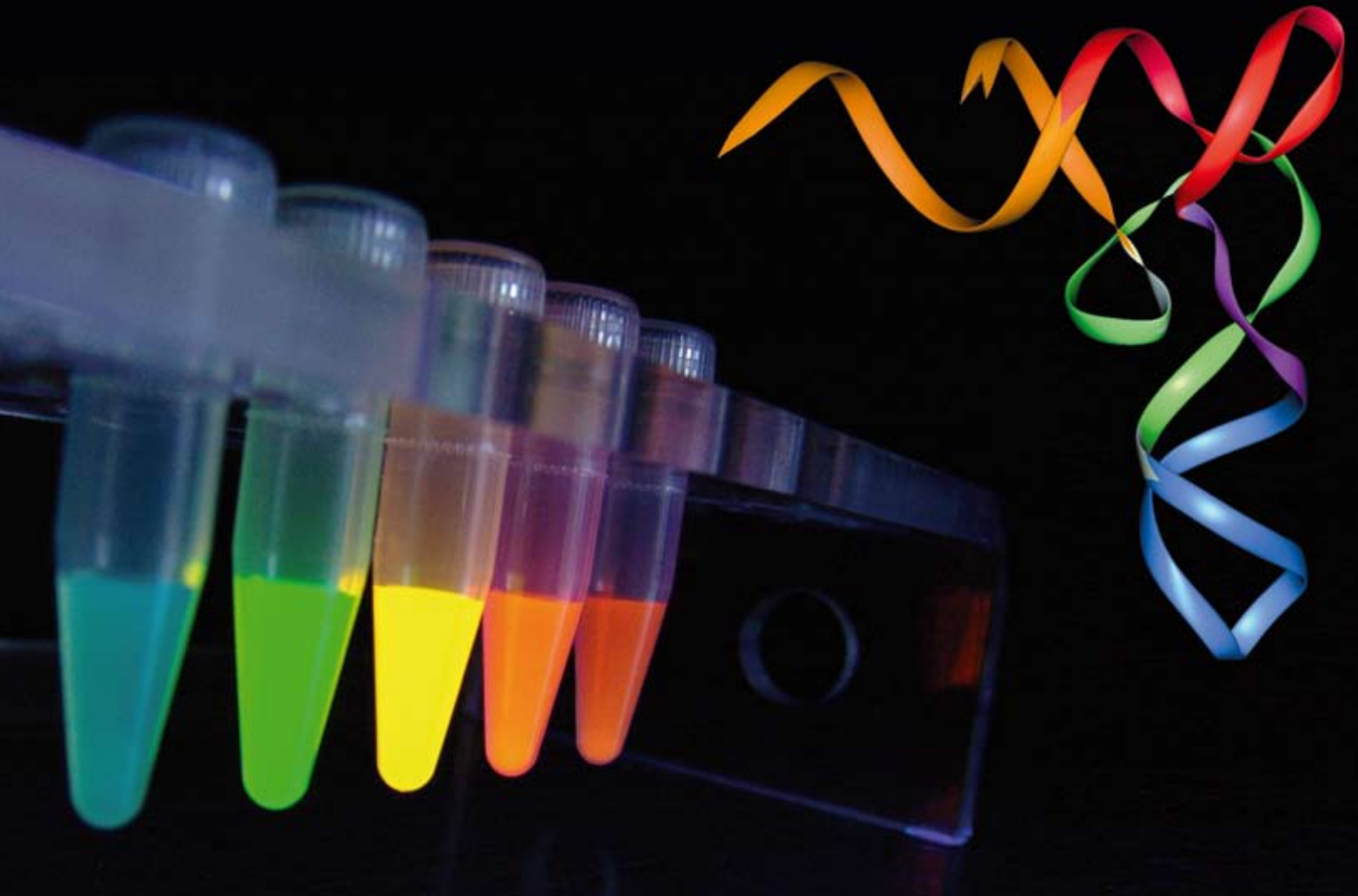


More than 18 years  
experience in RNA synthesis!



## IBA Nucleic Acid Specialties

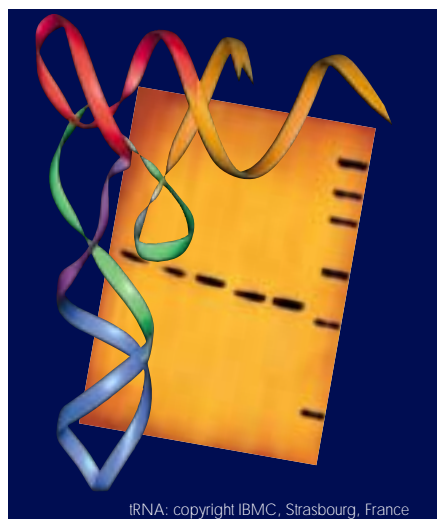
- DNA / RNA Oligos
- More than 40 modifications
- More than 100 dyes
- Chimeric Oligos (DNA/RNA)
- LNA (Locked Nucleic Acids)

## Custom-made for your needs

- Single molecule labeling / tracking
- Gene regulation studies
- *In vitro* transcription analysis
- *In vivo* imaging
- LNA for highly-specific binding
- FCS (Fluorescence Correlation Spectroscopy)

[www.rna-tools.com](http://www.rna-tools.com)

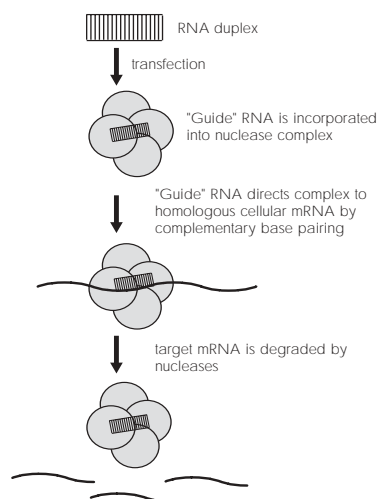
Turn for RNA specialties and fluorescent dyes



## References:

- 1 Amarzguioui M, Prydz H, 1998: Cell Mol Life Sci 54:1175-1202.
- 2 Famulok M, Jenne A, 1998: Curr Opin Chem Biol 2:320-327.
- 3 Vaish NK, Kore AR, Eckstein F, 1998: Nucleic Acids Res 26:5237-5242.
- 4 Putz J, Florentz C, Benseler F, Giege R, 1994: Nat Struct Biol 1:580-582.
- 5 Felden B, Florentz C, Westhof E, Giege R, 1993: Biochimie 75:1143-1157.
- 6 Famulok M, Mayer G, 1999: Curr Top Microbiol Immunol 243:123-136.

## Gene Silencing



## References:

- 7 Hunter T, Hunt T, Jackson RI, Robertson HD, 1975: J Biol Chem Jan 25;250(2):409-17.
- 8 Clemens MJ, Safer B, Merrick WC, Anderson WF, London IM, 1975: Proc Natl Acad Sci U S A Apr;72(4):1286-90.
- 9 Caplen NJ, Parrish S, Imani F, Fire A, Morgan AR, 2001: Proc Natl Acad Sci U S A. 2001, Aug. 14;98(17):9742-7.
- 10 Hamilton AJ, Baulcombe DC, 1999: Science 1999 Oct 29;286(5441):950-2.
- 11 Djikeng A, Shi H, Tschudi C, Ullu E, 2001: RNA 2001, Nov;7(11):1522-30
- 12 Sharp PA, 1999: Genes & Development 13:139-141.

For reference titles see [www.oligo-specialist.com](http://www.oligo-specialist.com).

## RNA oligonucleotides

### Take advantage of more than 18 years experience in RNA synthesis!

Already in 1991, IBA's nucleic acid division (at that time called "NAPS") has established RNA synthesis. In the following years new synthesis methods were developed to include long RNA, labeled RNA, 2'- and base-modified RNA, triphosphates, modified dinucleotides for 5' transcript labeling as well as double stranded RNA (dsRNA).

Our expertise enables us to provide high quality products with excellent purity and high biological activity.

### Some of the most important applications for RNA are

- dsRNA for gene silencing (RNA interference, inhibition of protein synthesis) (see below)
- Chimeric DNA/RNA for targeted gene repair in gene therapy (see page 4)
- Ribozymes for specific modulation of gene expression (1)
- Ribozymes for diagnostics (2)
- Investigation of ribozyme-substrate interactions (3)
- Investigation of tRNA function (4)
- RNA footprinting for the study of RNA-protein interactions (5)
- Aptamers for specific inhibition of protein function (6)
- Synthesis of RNA for *in vitro* translation experiments.

### Double stranded RNA for RNA interference studies

Since 1975 it is known that double stranded RNA (dsRNA) can inhibit protein synthesis (7,8). Several recent applications described the use of short dsRNA oligonucleotides for gene silencing, i.e. the inhibition of protein synthesis (9-11).

Being a specialist for RNA synthesis we are offering the RNA tools you require for these studies.

Short RNA duplexes are offered ready-to-use, i.e. PAGE purified, deprotected and annealed. A negative control sense and antisense RNA are included. There are no additional charges for the number of base pairs.

For longer RNA duplexes the costs are based on a price per base pair plus a fixed fee for annealing and purification.

product	synthesis scale	delivery amount	cat. no.
<b>Ready-to-use:</b> RNA duplexes, purified, deprotected and annealed, plus negative control (sense and antisense); <b>unlabeled</b>	0.2 µmol	20-40 nmol (140-280 µg) ds RNA; 5-10 nmol ssRNA as control	5-0515-113
	1.0 µmol	50-100 nmol ds RNA; 10-20 nmol ssRNA as control	5-0515-114
<b>Ready-to-use:</b> RNA duplexes with <b>fluorescent label or biotin</b> , purified, deprotected and annealed, plus negative control (sense and antisense)	1.0 µmol	50-100 nmol ds RNA; 10-20 nmol ssRNA as control	5-0516-124
<b>Ready-to-use:</b> control siRNA (β-Actin: lamin A/C); unlabeled		5, 10 or 25 nmol	5-0515-142/3 or 4 (lamin A/C)
		5, 10 or 25 nmol	5-0515-152/3 or 4 (β-Actin)
<b>Ready-to-use:</b> double stranded control RNA		5, 10 or 25 nmol	5-0515-132 /3 /4
<b>Ready-to-use:</b> double stranded control RNA, labeled		25 or 80 nmol	5-0515-163 /4

dsRNA is only available in combination with dsRNA annealing and purification

## Single stranded RNA oligonucleotides

- High biological activity
- Up to 50-70 bases depending on sequence and scale
- Easy introduction of modified bases
- Synthesis of larger quantities possible
- Specific labeling with fluorescent markers and other non-radioactive reporter groups
- Totally deprotected, HPLC and PAGE analyzed products
- Chemically synthesized

product	synthesis scale	cat. no.
Standard RNA	0.2 / 1.0 / 15.0 µmol	5-0510-13/14/15
RNA set-up for oligonucleotides containing less than 5 couplings		5-0510-000

The delivered amount depends on sequence and length. IBA strongly recommends PAGE purification, see [www.iba-go.com](http://www.iba-go.com).

## Modified RNA oligonucleotides

### 2'-Amino-modified RNA oligonucleotides (2'-Amino-RNA)

- Stabilization against nucleases
- 2'-Amino-rU and 2'-Amino-rC available

product	synthesis scale	cat. no.
2'-Amino-RNA	1.0 µmol	5-0511-014

### 2'-Fluoro-modified RNA oligonucleotides (2'-F-RNA)

- Stabilization against nucleases
- Increase of melting temperature by 2 °C per residue
- 2'-F-RNA/RNA duplexes are no substrates for RNase H
- Only 2'-F-rU and 2'-F-rC available

product	synthesis scale	cat. no.
2'-F-RNA	1.0 / 15.0 µmol	5-0512-014/5

### 2'-O-Methyl-modified RNA oligonucleotides (2'-O-Me-RNA)

- Provides stabilization against nucleases
- Increases melting temperature by 1.5 °C per residue
- 2'-O-Methyl-RNA/RNA hybrids are not recognized by RNase H
- Important for antisense applications

product	synthesis scale	cat. no.
2'-O-Me-RNA	0.05/0.20/1.00/15.00 µmol	5-0513-012/3/4/5

0.05 µmol scale not available in combination with RNA.

### Inosine modified RNA oligonucleotides (In-RNA)

- Special application in ribozyme technology
- Changes ribozyme cleavage specificity from NUH to NCH

product	synthesis scale	cat. no.
In-RNA	1.0/15.0 µmol	5-0514-014/5

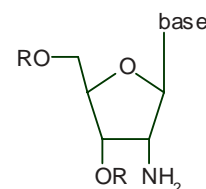
All DNA modifications (see [www.iba-go.com](http://www.iba-go.com)) can also be introduced in RNA. Please contact us if the modification you are looking for is not listed.

For purification of oligonucleotides  
[www.oligo-specialist.com](http://www.oligo-specialist.com)

References listing IBA as supplier:

- 1 Kurreck J, Wyszko E, Gillen C, Erdmann VA, 2002: Nucleic Acid Res 30, 9: 1911-1918.
- 2 Zabrorowska Z, Fürste PJ, Erdmann VA, Kurreck J, 2002: J Biol Chem 277, 43: 40617-40622.
- 3 Kurreck J, Bieber B, Jahn R, Erdmann VA, 2001: J Biol Chem 277, 9: 7099-7107.

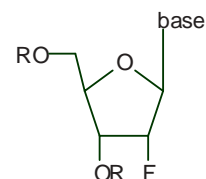
2'-Amino-RNA



Reference:

- Heidenreich O, Benseler F, Fahrenholz A, Eckstein F, 1994: J Biol Chem 269:2131-2138.

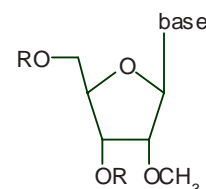
2'-Fluoro-RNA



References:

- 1 Pieken WA, Olson DB, Benseler F, Aurup H, Eckstein F, 1991: Science 253:314-317.
- 2 Heidenreich O, Eckstein F, 1992: J Biol Chem 267:1904-1909.

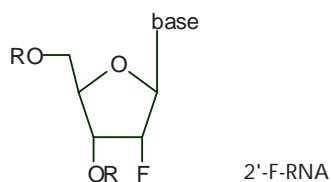
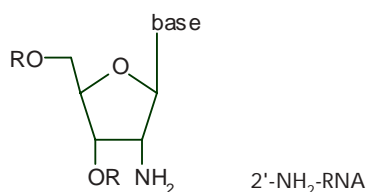
2'-O-Methyl-RNA



Reference:

- 1 Inoue H, Hayase Y, Imura A, Iwai S, Miura K, Ohtsuka E, 1987: Nucleic Acids Res 15:6131-6148.
- 2 Majlessi M, Nelson NC, Becker MM, 1998: Nucleic Acids Research 26, 2224-2229.
- 3 Lamond AI, Sproat BS, 1993: FEBS Lett Jun 28; 325(1-2):123-7.

For reference titles see [www.oligo-specialist.com](http://www.oligo-specialist.com).



For quotations for chimeric oligonucleotides please contact our nucleic acid department at [oligo@iba-go.com](mailto:oligo@iba-go.com).

## References:

- 1 Wu XS, Liu DP, Liang CC, 2001: J Biomed Sci, Nov-Dec;8(6):439-45.
- 2 Liu L, Rice MC, Kmiec EB, 2001: Nucleic Acids Res Oct 15;29(20):4238-50.
- 3 Kmiec EB, Johnson C, May GD, 2001: Plant J Aug;27(3):267-74.
- 4 Gamper HB, Parekh H, Rice MC, Bruner M, Youkey H, Kmiec EB, 2000: Nucleic Acids Res, Nov 1;28(21):4332-9.



For reference titles see [www.oligo-specialist.com](http://www.oligo-specialist.com).

## Chimeric oligonucleotides (RNA/DNA hybrids)

Several new applications have recently been described in the literature involving chimeric oligonucleotides (e.g. 1-4). Responding to the increasing demand of our customers we are offering a wide variety of combinations (e.g. DNA/RNA, RNA/2'-O-Me-RNA, 2'-F-RNA/DNA). Our extensive range of fluorescent and non-fluorescent markers (see pages 6 - 8) can of course be incorporated as well.

### Features

- Chemically synthesized
- Specific labeling with fluorescent markers and other non-radioactive reporter groups
- Easy introduction of modified bases
- Wide variety of combinations available

### Possible combinations

	DNA	RNA	2'-O-Me-RNA	2'-F-RNA	2'-NH <sub>2</sub> -RNA
DNA		x	x	x	x
RNA	x		x	x	x
2'-O-Me-RNA	x	x		x	x
2'-F-RNA	x	x	x		x
2'-NH <sub>2</sub> -RNA	x	x	x	x	

product	scale	cat. no.
DNA	1.00 µmol	5-0110-014
RNA	1.00 µmol	5-0510-014
2'-NH <sub>2</sub> -RNA	1.00 µmol	5-0511-014
2'-F-RNA	1.00 µmol	5-0512-014
2'-O-Me-RNA	1.00 µmol	5-0513-014
HPLC grade purification	1.00 µmol	5-1020-004
PAGE purification	Any scale	5-1060-001

2'-NH<sub>2</sub>-RNA, 2'-F-RNA and 2'-O-Me-RNA are only available with HPLC grade purification or PAGE purification. Further scales available.

## Single stranded RNA oligonucleotides, phosphorothioate (PTO-) protected

Toll-like receptors (TLRs) are fundamental for the innate immune response. Two of these orphan receptors TLR7/TLR8 have been identified to act as sensors for single stranded RNA. Whereas double stranded ribonucleic acid (dsRNA) was already known as a danger signal associated with viral infection and stimulates innate immune cells, the immunostimulatory potential of single stranded RNA (ssRNA) is poorly understood and respective receptors were unknown. Only recently members of the TLR family were identified to play an important role in the sensing of ssRNAs. Activation of TLRs leads to the generation of an adoptive immune response resulting in the eradication of pathogens. Guanosine (G)- and uridine (U)-rich ssRNA oligonucleotides derived from human immunodeficiency virus-1 (HIV-1) stimulate dendritic cells (DCs) and macrophages to secrete interferon- $\alpha$  and proinflammatory, as well as regulatory, cytokines.

Beside a research group at the TU Munich two other groups at the Imperial Cancer Research (ICRF) in London and the other at the Howard Hughes Medical Institute at Yale University in New Haven also reported on this phenomenon. Researchers in the group of Stefan Bauer at the TU Munich stated that this discovery has an interesting potential for the development of novel methods of immunization for vaccine design using RNA as adjuvant.

Mediators of the innate immune system for the sensing of bacterial pathogens such as CpG-rich motifs have already entered clinical trials.

product	synthesis scale	delivery amount [OD]	cat. no
RNA Phosphorothioate coupling	0.2 / 1.0 $\mu$ mol	5/ 20 OD	5-0411-013/4
RNA PTO 40/41/42	25 / 100 nmol		5-0515-553 /4

All modifications which are available for DNA are available for RNA phosphorothioates.

NEW

## Dinucleotides in all combinations available

### Transcription starters for 5'-labeled transcripts

5'-Modified ApG can be used in *in vitro* transcription experiments. It is incorporated only once at the 5'-end. By using this compound it is easy to either introduce fluorescent markers to make transcripts visible, or non-radioactive markers like biotin or digoxigenin to isolate transcription products. In principle all of the available dyes and non-radioactive reporter groups can be introduced. Please inquire for more information.

product	delivery amount	cat. no.
5'-Biotin-ApG	0.5/1.0/5.0/10.0 $\mu$ mol	5-0700-003/4/6/7
5'-Fluorescein-ApG	0.5/1.0/5.0/10.0 $\mu$ mol	5-0700-103/4/6/7
5'-TAMRA-ApG	0.5/1.0/5.0/10.0 $\mu$ mol	5-0700-203/4/6/7

Other labels and dinucleotides on request. For further dyes see page 6 - 8.

Reference:

Pitulle C, Kleinedam RG, Sproat B and Krupp G, 1992: Gene 112: 101-105.

### Available Dinucleotides

	A	C	G	U
A	X	X	X	X
C	X	X	X	X
G	X	X	X	X
U	X	X	X	X

All dinucleotide combinations available.  
Cat. nos. on request.

For reference titles see [www.oligo-specialist.com](http://www.oligo-specialist.com).

**Licensed supplier**

of custom oligos labeled with dyes patented by Molecular Probes (owned by Invitrogen Corp.) or GE Healthcare Biosciences Corp.

**Don't waste time by labeling oligos yourself:**

send us your activated dye and we do the labeling for you. Highly efficient and fast. Contact [oligo@iba-go.com](mailto:oligo@iba-go.com) for a quote.

Spectral data have been provided by suppliers of the dyes and can vary with conjugation and solvent.

## Reporter groups on oligonucleotides

### Fluorescent oligonucleotides

IBA is not only a licensed supplier of a broad spectrum of probes labeled with dyes from Molecular Probes (owned by Invitrogen Corp.) or GE Healthcare Biosciences Corp., we now also offer an interesting selection of new dyes from Evotec OAI, Dyomics and Atto-Tec. The range of these new dyes includes e.g. Dy 782 which can be excited with infrared light allowing many new applications.

All probes are double HPLC purified\*. Failure sequences are removed during the first HPLC; the second HPLC is performed to remove unlabeled oligonucleotides and excessive dye. As a result only labeled oligonucleotides of excellent quality are obtained.

\*with the exception of the directly coupled dyes where no excessive dye must be eliminated

### We offer

- High quality: double HPLC purification yields labeled oligonucleotides only
- A new selection of dyes including the infrared excitable Dy 782
- Very competitive prices

### Dyes available for oligonucleotide labeling

(further dyes on request)

Product	Abs (nm)	Emis (nm)	€
Pyrene	340 nm	376 nm	43000
Dansyl-X	340 nm	520 nm	4200
Alexa Fluor® 350	345 nm	440 nm	19000
AMCA -X	353 nm	442 nm	19000
Atto 390	390 nm	479 nm	24000
Alexa Fluor® 405	400 nm	424 nm	34000
Dy 415	418 nm	467 nm	34000
Hydroxy coumarin	419 nm	447 nm	36000
D-AMCA	432 nm	472 nm	56000
Alexa Fluor® 430 <sup>1)</sup>	434 nm	541 nm	16000
Atto 425	436 nm	484 nm	45000
Atto 465	453 nm	508 nm	75000
Dabcyl	453 nm	none	32000
Dy 485 XL <sup>1)</sup>	485 nm	560 nm	50000
Alexa Fluor® 488 <sup>5)</sup>	490 nm	520 nm	71000
Fluorescein-5-EX	491 nm	515 nm	86000
BHQ-0	493 nm	none	34000
FAM, 5-isomer	494 nm	520 nm	78000
Atto 495	495 nm	527 nm	80000
Dy 495	495 nm	520 nm	70000
FAM, 6-isomer	496 nm	516 nm	83000
IBAPy 493/503	500 nm	509 nm	79000
Dy 480 XL <sup>1)</sup>	500 nm	630 nm	50000
Atto 488	501 nm	523 nm	90000
IBAPyFL	502 nm	510 nm	82000
Dy 505	505 nm	530 nm	80000
Dy 505-X	505 nm	530 nm	85000
Rhodamine 110X	505 nm	530 nm	85000
Dy 510 XL <sup>1)</sup>	509 nm	590 nm	50000
Dy 481 XL <sup>1)</sup>	515 nm	650 nm	50000
TET	519 nm	539 nm	98000
Dy 520 XL <sup>1)</sup>	520 nm	664 nm	50000
JOE, 6-isomer	520 nm	548 nm	71000
Dy 521 XL <sup>1)</sup>	523 nm	668 nm	50000
Carboxy-rhodamine 6G	524 nm	550 nm	102000
Carboxy-rhodamine 6G	524 nm	557 nm	108000
Atto 520	525 nm	545 nm	110000
Alexa Fluor® 532	525 nm	550 nm	81000
IBAPy R6G	528 nm	547 nm	70000
Atto 532	532 nm	553 nm	115000
IBAPy 530/550	534 nm	551 nm	77000
BHQ-1	534 nm	none	34000

# Nucleic acid synthesis technology

Product	Abs (nm)	Emis (nm)	€
HEX	537 nm	556 nm	99000
Atto 540Q	542 nm	none	105000
IBAPyTMR-X	544 nm	570 nm	56000
TAMRA , 5-isomer (FRET)	546 nm	579 nm	91000
TAMRA, 6-isomer	547 nm	573 nm	91000
Dy 555	547 nm	572 nm	100000
Quasar 570 <sup>3)</sup>	547 nm	570 nm	115000
Dy 556	548 nm	573 nm	100000
Cy3 <sup>TM</sup> NHS	550 nm	570 nm	150000
Cy3 <sup>TM</sup> Amidite	550 nm	570 nm	150000
Dy 554	551 nm	572 nm	100000
Atto 550	554 nm	576 nm	120000
Alexa Fluor <sup>®</sup> 546	555 nm	570 nm	104000
Alexa Fluor <sup>®</sup> 555 <sup>6)</sup>	555 nm	565 nm	158000
Oyster 556	556 nm	570 nm	155000
Dy 547 <sup>3)</sup>	557 nm	574 nm	150000
Dy 548	558 nm	572 nm	150000
Dy 560	559 nm	578 nm	120000
Atto 565	563 nm	592 nm	120000
Carboxy-X-rhodamine	574 nm	602 nm	78000
Alexa Fluor <sup>®</sup> 568	575 nm	560 nm	91300
Carboxy-X-rhodamine	575 nm	602 nm	82000
BHQ-2	579 nm	none	38000
Dy 590	580 nm	599 nm	120000
Cy3.5 <sup>TM</sup> NHS	581 nm	596 nm	150000
Cy3.5 <sup>TM</sup> Amidite	581 nm	596 nm	150000
Sulforhodamine 101	583 nm	603 nm	116000
Atto 580Q	586 nm	none	110000
Alexa Fluor <sup>®</sup> 594	590 nm	615 nm	92000
Atto 590	594 nm	624 nm	120000
Atto 594	601 nm	627 nm	120000
Dy 610	610 nm	630 nm	80000
Alexa Fluor <sup>®</sup> 610	612 nm	628 nm	138000
Atto 610 <sup>2)</sup>	615 nm	634 nm	150000
Atto 612Q	615 nm	none	114000
Atto 620	619 nm	643 nm	120000
Dy 615	621 nm	641 nm	200000
Atto 633	629 nm	657 nm	130000
EVOblue <sup>TM</sup> 30	630 nm	670 nm	100000
Alexa Fluor <sup>®</sup> 633	632 nm	647 nm	100000
Atto 637 <sup>2)</sup>	633 nm	658 nm	120000
Dy 634	635 nm	658 nm	200000
Dy 630	636 nm	657 nm	200000
Dy 631	637 nm	658 nm	200000
Dy 632	637 nm	657 nm	200000
Dy 633	637 nm	657 nm	200000
Atto 647-N <sup>4)</sup>	644 nm	669 nm	150000
Quasar 670 <sup>4)</sup>	644 nm	670 nm	187000
Dy 636	647 nm	671 nm	200000
Oyster 645	645 nm	666 nm	250000
Dy 635	647 nm	671 nm	200000
Cy5 <sup>TM</sup> NHS	649 nm	670 nm	250000
Cy5 <sup>TM</sup> Amidite	649 nm	670 nm	250000
Alexa Fluor <sup>®</sup> 647 <sup>5)</sup>	650 nm	670 nm	239000
BHQ 650	598 nm	none	40667
Dy 647 <sup>4)</sup>	653 nm	672 nm	250000
Dy 648	653 nm	674 nm	250000
Dy 650	653 nm	674 nm	220000
Dy 652	654 nm	675 nm	220000
Oyster 656	656 nm	674 nm	220000
Dy 651	656 nm	678 nm	220000
Alexa Fluor <sup>®</sup> 660	660 nm	690 nm	132000
DyQ 660	660 nm	none	140000
DyQ 661	662 nm	none	140000
Atto 655	663 nm	684 nm	125000
Methylene Blue	665 nm	690 nm	93000
BHQ-3	672 nm	none	42700
Dy 677	673 nm	694 nm	180000
Dy 676	674 nm	699 nm	180000
Cy5.5 <sup>TM</sup> NHS	675 nm	694 nm	250000



Labels and modifications are normally delivered HPLC-purified. Nevertheless, some labels and modifications are subject to require further purification procedures, which will be added to the invoice: Please note, that e.g. Alexa Fluor® 488 and 647 labeled oligos are only available with an additional Reverse Phase HPLC. Alexa Fluor® 555 is only available in combination with PAGE purification. Labels and modifications are normally delivered HPLC-purified. Nevertheless, some labels and modifications are subject to require further purification procedures, which will be added to the invoice: Please note, that e.g. Alexa Fluor® 488 and 647 labeled oligos are only available with an additional Reverse Phase HPLC. Alexa Fluor® 555 is only available in combination with PAGE purification.

Product	Abs (nm)	Emis (nm)	€
Cy5.5™ Amidite	675 nm	694 nm	250000
Atto 680	680 nm	700 nm	125000
Alexa Fluor® 680	680 nm	700 nm	184000
Dy 680	690 nm	709 nm	140000
Dy 682	690 nm	709 nm	140000
Dy 681	691 nm	708 nm	140000
Atto 700	700 nm	718 nm	120000
Alexa Fluor® 700	702 nm	723 nm	192000
Dy 701	706 nm	731 nm	140000
Dy 700	707 nm	730 nm	140000
Atto 725 <sup>2)</sup>	725 nm	752 nm	120000
Dy 730	732 nm	758 nm	240000
Dy 734	734 nm	766 nm	240000
Dy 731	736 nm	760 nm	240000
Dy 732	736 nm	759 nm	240000
Atto 740 <sup>2)</sup>	740 nm	764 nm	120000
Dy 750	747 nm	776 nm	270000
Dy 752	748 nm	772 nm	270000
Cy7™ NHS	748 nm	767 nm	250000
Alexa Fluor® 750	749 nm	775 nm	240000
Dy 751	751 nm	779 nm	270000
Dy 776	771 nm	801 nm	240000
Dy 780	782 nm	800 nm	170000
Dy 782 (infrared!)	782 nm	800 nm	102000
Dy 781	783 nm	800 nm	170000
Dy 831	844 nm	none	220000

<sup>1)</sup> dyes with large Stokes shift

<sup>2)</sup> very base-sensitive, additional purification recommended

<sup>3)</sup> very good alternative for Cy3

<sup>4)</sup> very good alternative for Cy5

<sup>5)</sup> only available with an additional Reverse Phase HPLC

<sup>6)</sup> only available in combination with PAGE purification

References listing IBA as supplier:

1 Bernacchi S, Mely Y, 2001: Nucleic Acid Res, 29, 13 e62.

2 Foldes-Papp Z, Angerer B, Thyberg P, Hinz M, Wennmalm S, Ankenbauer W, Seliger H, Holmgren A, Rigler R. J Biotechnol 2001 Apr 13;86(3):203-24.

Fluorescently labeled oligonucleotides are used for:

- Non-radioactive sequencing
- Mutation analysis
- Primer extension analysis
- Gene scan analysis
- Fragment analysis
- Multiplex PCR
- Quantitative PCR
- Online monitoring of PCR
- FCS-Spectroscopy
- *In situ* hybridization
- Screening
- Measuring ribozyme kinetics

IBA offers a broad spectrum of dyes for all of these applications.

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