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| **Author, Ref** | **Year** | **NIR** | **MIS** | **Case** | **Application** | **Disease** | **Age** | **LC (%)** | **Timing** | **Dose (/body)** | **MH (%)** | **Size (mm)** | **Det/FP (%)** | **Seg (%)** | **Depth (mm)** | **SIGN** |
| Gotoh K56 | 2009 | PDE | NO | 10 | Tumor Det | HCC | 67 (55-76) | 50.0 | Preoperative:4.8 (1-8) days prior | 0.5 mg/kg | NA | 33.5 (22-45) | NA | NA | NA | LOW |
| Aoki T57 | 2010 | PDE | YES | 81 | Seg | PLC, Mets | 69 (46-87) | 18.5 | Intraoperative: PS | 5 mg | NA | NA | NA | 86.6 in LC | NA | ACCEPT |
| Uchiyama K58 | 2010 | PDE | NO | 32 | Tumor Det | CRLM | 71.8 ± 9.3 | NA | Preoperative: 2 weeks prior | 0.5 mg/kg | NA | 8 and 21 | 98.1/3.7 | NA | 5 | ACCEPT |
| Uchiyama K43 | 2011 | PDE | NO | 22 | Seg | HCC | 73.5 ± 9.8 | 100 | Intraoperative: NS | 0.5 mg/kg | 36 | NA | NA | NA | NA | ACCEPT |
| Ishizawa T41 | 2012 | NA | YES | 2 | Seg | NA | NA | NA | Intraoperative: PS and NS | 0.025 mg for PS 2.5 mg for NS | NA | NA | NA | NA | NA | LOW |
| Ishizuka M59 | 2012 | PDE | NO | 7 | Tumor Det | CRLM | 64.7±8.5 | NA | Preoperative: 6.1 ± 5.1 days prior | 0.1 mg/kg | 0 | NA | 100/2.1 | NA | NA | LOW |
| Peloso A60 | 2013 | PDE | YES | 25 | Tumor Det | CRLM | 61.5 (42–87) | NA | Preoperative: 24h prior | 0.5 mg/kg | NA | NA | 80.0/1.3 | NA | NA | ACCEPT |
| Satou S53 | 2013 | PDE | NO | 17 | Tumor Det | HCC | 66 (55–78) | NA | Preoperative: 3 (1–24) days prior | 0.5 mg/kg | NA | NA | 96 | NA | NA | LOW |
| Morita Y29 | 2013 | PDE | NO | 58 | Tumor Det | HCC | 71 ± 8.4 | NA | Preoperative: 3–28 days prior | 0.5 mg/kg | NA | 2.2 ± 1.6 | 96.0/28.5 | NA | NA | ACCEPT |
| van der Vorst JR27 | 2013 | Others | NO | 40 | Tumor Det | CRLM | 63 (45-77) | 0 | Preoperative: 24 or 48 hours prior | 10 or 20 mg | 15 | 24.5 ± 19.7 | 77.2/0 | NA | 6-8 | HIGH |
| Sakoda M61 | 2014 | Olympus | YES | 2 | Seg | HCC | 72, 78 | 100 | Intraoperative: PS | 5 mg | 0 | 35 and 20 | NA | NA | NA | LOW |
| Kudo H62 | 2014 | Olympus | YES | 17 | Tumor Det | HCC, CRLM | NA | NA | Preoperative: within 2 weeks | 0.5 mg/kg | NA | 18 (3–65) | NA | NA | 8 | LOW |
| Ishizawa T63 | 2014 | PDE | NO | 170 | Tumor Det | HCC | NA | 64.1 | Preoperative: within 2 weeks | 0.5 mg/kg | NA | 16 and 23 | 98.9/5.9 | NA | 5-10 | HIGH |
| Tanaka T28 | 2014 | PDE | NO | 33 | Tumor Det | PLC, CRLM | 61 and 67.5 | 27.2 | Preoperative: >2 days prior | 0.5 mg/kg | NA | 32.4, 20.7 | 68/ 0 in non-LC  100/95 in LC | NA | 1.5 | ACCEPT |
| Kurihara T64 | 2015 | HEMS | NO | 2 | Seg | ICC, CRLM | 78. 58 | 0 | Intraoperative: NS | 0.25 mg/kg | 100 | 18-40 | NA | NA | NA | LOW |
| Inoue Y65 | 2015 | HEMS | NO | 24 | Seg | PLC, CRLM | 70(51-86) | 16 | Intraoperative: PS and NS | 2.5 mg | 25 | NA | NA | 95.8 | NA | HIGH |
| Kawaguchi Y26 | 2015 | Olympus | YES | 2 | Tumor Det | HCC, CRLM | 66, 73 | 50 | Preoperative: 2 weeks prior | 0.5 mg/kg | 0 | NA | NA | NA | NA | LOW |
| Miyata A66 | 2015 | PDE | NO | 30 | Seg | PLC, CRLM | NA | 20 | Intraoperative: PS | 0.25 mg | 7 | NA | NA | 100 | NA | ACCEPT |
| Tummers QR67 | 2015 | STORZ | YES | 3 | Tumor Det | melanoma | 75, 66, 65 | NA | Preoperative: 1 day prior | 10 mg | 0 | 17 (12-28) | NA | NA | 5 | LOW |
| Abo T14 | 2015 | PDE | NO | 117 | Tumor Det, Seg | PLC, CRLM | 68.6 ± 11.6 | 12.8 | Preoperative: 4-7 days prior  (>14 days, additional IV) Intraoperative: PS | Preoperative: 0.5 mg/kg Intraoperative: 1.25 mg | 27 | 36 ± 18 | 75.0/24.0 | NA | 10 | HIGH |
| Takahashi H68 | 2016 | Firefly, PIN | YES | 15 | Tumor Det | CRLM, FNH | 55.7 (37-76) | NA | 1-2 days prior or intraoperative IV | 7.5 mg or 5 mg | 0 | NA | 100 | NA | NA | LOW |
| Kaibori M69 | 2016 | PDE | NO | 48 | Tumor Det | PLC, CRLM | 72±9 | NA | Preoperative: 14 days prior | 0.5 mg/kg | NA | 46 ± 33 | 96 | NA | NA | LOW |
| Boogerd L.S.F.32 | 2016 | STORZ | YES | 22 | Tumor Det | HCC, CRLM, others | 65 (28-76) | 14 | Preoperative: 24h prior | 10 mg | NA | 20 (1–58) | 92.3/25.0 | NA | 8 | LOW |
| Barabino G70 | 2016 | Others | NO | 3 | Tumor Det | CRLM | N/A | NA | Preoperative: 24h prior | 0.25 mg/kg | NA | NA | NA | NA | NA | LOW |
| Kobayashi Y42 | 2017 | PDE | NO | 105 | Seg | PLC, Mets | 68 (17-83) | 14.3 | Intraoperative: PS and NS | 0.25 mg | 10 | NA | NA | NA | NA | HIGH |
| Kawaguchi Y71 | 2017 | PDE | NO | 21 | Seg | HCC, CRLM | 67 (38–84) | 19.0 | Intraoperative: NS | 2.5 μg/ml \* TLV | 33 | 40 (6–110) | NA | NA | NA | LOW |
| Handgraaf HJM31 | 2017 | Others | NO | 67 | Tumor Det | CRLM | 62 ± 9.2 | NA | Preoperative: 1 or 2 days prior | 10 or 20 mg | 10 | NA | NA | NA | 8 | ACCEPT |
| Masuda K30 | 2017 | Others | NO | 33 | Tumor Det | HCC | 53 ± 9.2 | 100 | Preoperative: 1 week prior | 0.05 mg/kg | Explant | 15.2 ± 10.8 | 72.2 | NA | 7-10 | ACCEPT |
| Terasawa M72 | 2017 | PIN | YES | 41 | Tumor Det, Seg | HCC, CRLM | 65 (35–93) | NA | Preoperative: within 3 days Intraoperative: NS | Preoperative: 0.5 mg/kg  Intraoperative: 1.25 mg | 0 | 14 (1–45) | 85 | NA | 9 | ACCEPT |
| Zhang YM18 | 2017 | PDE | YES | 50 | Tumor Det, Seg | PLC, CRLM | 54.18 | 4 | Intraoperative: PS and NS | 0.25 mg/kg | NA | NA | NA | NA | 10 | ACCEPT |
| Meng X73 | 2018 | PIN | NO | 1 | Seg | Healthy liver | 34 | 0 | Intraoperative: PS | 1.0 mg | 100 | NA | 88 | NA | NA | LOW |
| Nomi T74 | 2018 | PIN | YES | 16 | Seg | NA | NA | NA | Intraoperative: NS | 1.5 mg | 13 | NA | NA | NA | NA | LOW |
| Nishino H75 | 2018 | Others | NO | 23 | Seg | PLC, CRLM | 66.9 ± 10.7 | NA | Intraoperative: PS and NS | 0.25 mg | 61 | NA | NA | 91.3 | NA | LOW |
| Benedicenti S49 | 2018 | PDE | NO | 1 | Tumor Det | Mets of SCC | 74 | NA | Preoperative: 10 days prior | 0.5 mg/kg | 0 | 22 | NA | NA | NA | LOW |
| Nanashima A17 | 2018 | PDE | NO | 3 | Tumor Det | HCC | 66, 84, and 76 | 33.3 | Preoperative: several days prior | 0.5 mg/kg | 67 | NA | NA | NA | NA | LOW |
| Lieto E76 | 2018 | Others | NO | 9 | Tumor Det | HCC, CRLM | 65 (64-79) | NA | Preoperative: 24h prior | 0.5 mg/kg | NA | 35 (7-60) | NA | NA | NA | LOW |
| Peyrat P77 | 2018 | Others | NO | 43 | Tumor Det, Seg | PLC, CRLM | 66.2 (38–84) | NA | Preoperative: 1 day prior Intraoperative: PS | Preoperative:0.25 mg/kg Intraoperative: 0.016-1.25 mg | NA | 9.5 (0–200) | 67.2/21.5 | NA | 1.2 (max 13) | LOW |
| Cheung TT20 | 2018 | PIN | YES | 20 | Tumor Det, Seg | HCC | 60.5 (47–73) | 100 | Preoperative: 10 days prior (>14 days, additional IV) Intraoperative: NS | Preoperative: 0.5 mg/kg Intraoperative: 0.025 mg | 25 | 27.5 (12–65) | NA | NA | NA | ACCEPT |
| Ueno M78 | 2019 | PIN | YES | 10 | Seg | HCC, CRLM | 74 ± 7 | NA | Intraoperative: PS | 0.25 mg | 0 | 35 ± 11 | NA | NA | NA | LOW |
| Nanashima A79 | 2019 | PDE | NO | 40 | Seg | PLC, CRLM | 68.6 ± 9.1 | 17.5 | Intraoperative: PS | 1.25 mg | 23 | NA | NA | 88 | NA | LOW |
| Chiba N80 | 2019 | HEMS | NO | 24 | Seg | Gallbladder Ca | 73 (56-82) | NA | Intraoperative: PS | 5 mg | 0 | NA | NA | NA | NA | LOW |
| Lim HJ19 | 2019 | IMAGE1, HEMS | NO | 32 | Tumor Det | HCC, CRLM | NA | 46.9 | Preoperative: <3 days: 11 cases, >4 days: 21 cases | NA | NA | NA | 91.7 in the group of >4 days interval | NA | 1.6 | ACCEPT |
| Gon H81 | 2019 | PIN | NO | 110 | Tumor Det,  Seg | NA | NA | NA | Preoperative: 2 days prior Intraoperative: NS | 0.5 mg/kg | NA | NA | NA | NA | NA | LOW |
| Yoshioka M82 | 2019 | NA | YES | 1 | Tumor Det | HCC | 73 | 100 | Preoperative: 2 days prior | 0.5 mg/kg | 0 | 15 | NA | NA | NA | LOW |
| Alfano MS23 | 2019 | IMAGE1S | NO | 27 | Tumor Det | PLC, CRLM | 68.2 ± 9.0 | 48.2 | Preoperative: within 7 days (>7 days, additional IV) | 0.5 mg/kg | 15 | NA | 92.6 | NA | <7 | LOW |
| Xu Y45 | 2020 | PIN | YES | 36 | Seg | PLC, others | 58 (34-74) | 67 | Intraoperative: PS and NS | 1.25-2.5 mg for PS 2.5 mg for NS | 42 | NA | NA | 53 | NA | LOW |
| Kubo N83 | 2020 | HEMS, PIN | NO | 12 | Seg | PLC, CRLM | 67.3 ± 9.0 | NA | Intraoperative: NS | 2.5 mg | 100 | 43 ± 23 | NA | NA | NA | LOW |
| Ito D84 | 2020 | PIN | YES | 3 | Seg | HCC, CRLM | 71.7 ± 6.0 | NA | Intraoperative: PS | 0.25 mg | 0 | NA | NA | 94.3 | NA | LOW |
| He JM85 | 2020 | NA | YES | 1 | Seg | HCC | 74 | 100 | Intraoperative: PS | NA | 0 | 27 | NA | NA | NA | LOW |
| Pansa A86 | 2020 | PIN | NO | 1 | Seg | HCC | 71 | NA | Intraoperative: NS | 7.5 mg | 0 | 35 | NA | NA | NA | LOW |
| Urade T35 | 2020 | Visera, PIN | YES | 3 | Seg | HCC, CRLM | 64 ± 18 | 33.3 | Intraoperative: NS | 2.5 mg | 0 | 31 ± 3 | NA | NA | NA | LOW |
| Aoki T44 | 2020 | PIN | YES | 14 | Seg | HCC, CRLM | 64(42-85) | NA | Preoperative: PS | 0.025 mg | 0 | 28 (8-50) | NA | 80 | NA | LOW |
| Li CG87 | 2020 | NA | YES | 22 | Tumor Det | FNH | 30.5 | NA | Preoperative: 48h prior | 0.25 mg/kg | 0 | 56 ± 29 | NA | NA | NA | LOW |
| Achterberg FB88 | 2020 | Visera, PIN, Firefly | YES | 16 lesions | Tumor Det | CRLM | NA | NA | Preoperative: 24h prior | 10 mg | 0 | 22.5 (8-37) | NA | NA | NA | LOW |
| Li B89 | 2020 | NA | YES | 1 | Tumor Det | HCC | 57 | NA | Preoperative: 72h prior | 0.25 mg/kg | 0 | 30 | NA | NA | NA | LOW |
| Tashiro Y90 | 2020 | PIN | NO | 52 | Tumor Det | HCC, CRLM | 72 and 67.5 (34-85) | 3.8 | Preoperative: 2-14 days prior | 0.5 mg/kg | NA | 25 and 36 | NA | NA | NA | ACCEPT |
| He K91 | 2020 | Others | YES | 21 | Tumor Det | Hepatolithiasis | 53.8 ± 15.0 | NA | Intraoperative: not detailed | 0.25 mg/kg | 0 | NA | NA | NA | NA | ACCEPT |
| Lu H92 | 2020 | PIN | YES | 57 | Tumor Det, Seg | PLC, Mets | 57.3 ± 12.2 | 24.6 | Preoperative: 0-7 days prior Intraoperative: NS | 0.5 mg/kg | NA | 45 (25-51) | NA | NA | NA | HIGH |
| Li YP93 | 2020 | PIN | YES | 9 | Tumor Det, Seg | Echinococcosis | 36.4 ± 7.6 | NA | Preoperative: 3 days prior Intraoperative: NS | Preoperative: 0.5 mg/kg Intraoperative: 2.5 mg | 0 | 94 ± 23 | NA | NA | NA | LOW |
| Miyashita S94 | 2020 | Others | NO | 15 | Tumor Det, Seg | PLC, CRLM | 73 (52-82) | NA | Preoperative: 3-4 days prior Intraoperative: PS and NS | Preoperative: 0.5 mg/kg Intraoperative: 0.025 mg for PS, 0.25mg for NS | 0 | NA | 86.8 | NA | NA | LOW |
| Yao S95 | 2020 | PDE | NO | 18 | Tumor Det, Seg | HCC | 52.9 ± 12.1 | NA | Intraoperative: PS and NS | 2.5 mg | 100 | 63 ± 32 | NA | NA | NA | HIGH |
| Zhang P96 | 2020 | Others | YES | 30 | Tumor Det, Seg | PLC, FNH | 55.7 ± 11.2 | 33.3 | Preoperative: 24-72h prior Intraoperative: PS and NS | Preoperative: 0.05-0.10 mg/kg Intraoperative: 2.5mg | 40 | NA | NA | NA | NA | ACCEPT |
| Marino MV5 | 2020 | Firefly | YES | 40 | Tumor Det, Seg | PLC, CRLM | 69.4 (38–79) | 15 | Preoperative: 5 days prior Intraoperative: PS and NS | Preoperative: 0.5mg/kg Intraoperative: 0.25 mg for PS, 2.5 mg for NS | 45 | 7.4 (2–44) | 88.1 | 87.5 | NA | ACCEPT |
| Kose E47 | 2020 | PIN, Firefly | YES | 41 | Tumor Det, Seg | PLC, CRLM | 58.8 ± 13.5 | NA | Preoperative: 1 day prior | 7.5 mg | NA | 20 ± 18 | 43 | NA | NA | ACCEPT |
| Berardi G12 | 2021 | Visera, PIN | YES | 86 | Seg | HCC, CRLM | 69 (66-77) | 59.3 | Intraoperative: NS | 0.5 mg | 0 | 30 (24-40) | NA | NA | NA | HIGH |
| Kim J97 | 2021 | PIN, Others | NO | 46 | Seg | Healthy liver | 53.7 ± 11.8 | 0 | Intraoperative: NS | 0.025 mg/kg | 100 | NA | NA | NA | NA | ACCEPT |
| Procopio F98 | 2021 | HEMS | NO | 15 | Seg | HCC | 71 (52-85) | 86.7 | Intraoperative: NS | 0.5 mg/kg | 0 | 65 (2-7) | NA | NA | NA | LOW |
| Mehdorn AS13 | 2021 | Firefly | YES | 20 | Tumor Det | HCC, CRLM | 64.0 ± 12.3 | NA | Preoperative: 24h prior | 0.32 ± 0.08 mg/kg | 5 | 23.8 ± 11.5 | 70/15 | NA | NA | ACCEPT |
| Matsumura M99 | 2021 | PIN | NO | 1 | Tumor Det | HCC | 72 | NA | Preoperative: 1 day prior | 2.5 mg | 100 | 4.0 | NA | NA | NA | LOW |
| Bijlstra OD100 | 2021 | Others | NO | 2 | Tumor Det | GIST | 69 and 82 | NA | Preoperative: 24h prior | 10 mg | 0 | 8 (2-44) | NA | NA | NA | LOW |
| Kobayashi K9 | 2021 | PIN, PDE | NO | 82 | Tumor Det | HCC, others | NA | 46.3 | Preoperative: 1 day prior or 5 (1-10) days prior for ICG15 | 0.25-3.75 mg or  0.5 mg/kg for lCG15 | NA | 14-26 | 9.1-86.5/0-31.3 | NA | 1-2 | HIGH |
| Zheng JH101 | 2021 | PIN | YES | 1 | Tumor Det, Seg | HCC | 42 | 100 | Preoperative: 5 days prior Intraoperative: NS | Preoperative: 0.5 mg/kg Intraoperative: 5 mg | 0 | NA | NA | NA | NA | LOW |
| Ref: reference, MIS: minimally invasive surgery, NIR: near-infrared camera, LC: liver cirrhosis, MH: major hepatectomy, Det: detection rate, FP: false positive rate, Seg: liver segmentation, Tumor Det: tumor detection, SIGN: Scottish Intercollegiate Guidelines Network, PDE: Photodynamic Eye (Hamamatsu Photonics Co., Shizuoka, Japan), PIN: PINPOINT (Stryker Co., Michigan, US), HEMS: HyperEye Medical System (Mizuho Co., Ltd., Tokyo, Japan), Visera: Visera Elite II (Olympus Co., Tokyo, Japan), Image 1/Image 1S: Image 1/Image1 S camera systems (KARL STORZ SE and Co. KG, Tuttlingen, Germany), STORZ: KARL STORZ SE and Co. KG (Tuttlingen, Germany), HCC: Hepatocellular Carcinoma, CRLM: Colorectal liver metastases, Mets: metastases (undefined), PLC: Primary liver cancer, ICC: Intrahepatic cholangiocarcinoma, FNH: Focal nodular hyperplasia, GIST: gastrointestinal stromal tumor, SCC: Squamous cell carcinoma PS: positive staining, NS: negative staining, IV: Intravenous injection, TLV: total liver volume, ICG15: Indocyanine green retention rate at 15 minutes | | | | | | | | | | | | | | | | |