

Decoy ODN transfection (in vivo)

| No | Author | Reference | PubMed ID | Host | Target organ / tissue | Delivery route | ODN target | ODN dose | HVJ-E dose | dosing strategy | Remarks |
|----|---------------------------|--|-----------|-------|------------------------|--------------------------------|--|----------|------------|--|-------------------------------|
| 1 | K. Sumi <i>et al.</i> | <i>Gene Ther.</i> , 11(24), 1763-1771 (2004). | 15306843 | Mouse | skin, ear lobe | subcutaneous injection | STAT-6 | 800 µg | | | |
| 2 | N. Matsuda <i>et al.</i> | <i>Mol. Pharmacol.</i> , 67, 1018-1025 (2005). | 15576632 | Mouse | lung | tail vein | NF-κB | 80 µg | | | |
| 3 | S. F Feigl <i>et al.</i> | <i>J. Clin. Invest.</i> , 115, 3057-3071 (2005). | 16239967 | Mouse | colonic lamina propria | Intrarectal, intraperitoneal | NF-κB | 75 µg | | i.r :day 0, ip: day 1, 2 | |
| 4 | H. Nakamura <i>et al.</i> | <i>FEBS Lett.</i> , 580(11), 2717-2722 (2006). | 16647058 | Mouse | uterus | uterine cavity injection | STAT-3 | | | | |
| 5 | N. Matsuda <i>et al.</i> | <i>J. Pharmacol. Exp. Ther.</i> , 332(3), 730-737 (2010). | 20008488 | Mouse | spleen | tail vein | NF-κB | 100µg | | | sepsis induction Decoy ODN |
| 6 | T. Watanabe <i>et al.</i> | <i>J. Clin. Invest.</i> , 120(5), 1645-1662 (2010). | 20389019 | Mouse | | intraperitoneal administration | NF-κB | | | day1,2 before H.pylori infection | |
| 7 | T. Kimura <i>et al.</i> | <i>Indian J. Physiol. Pharmacol.</i> , 54(5),27-32 (2010). | | Mouse | uterus | uterine cavity injection | NF-κ B , Stat-3, AP-1 | | | | |
| 8 | Y. Oishi <i>et al.</i> | <i>Am. J. Physiol. Lung Cell Mol. Physiol.</i> , 303(2), 130-140 (2012). | 22610350 | Mouse | lung | tail vein | cyclic AMP response element binding protein (CREB) decoy ODN | 120µg | | | sepsis induction |
| 9 | S. F Feigl <i>et al.</i> | <i>J. Immunol.</i> , 192(8), 3969-3980 (2014). | 24634488 | Mouse | | intrarectal injection | STAT-6 | | | | |
| 10 | H. Nakamura <i>et al.</i> | <i>J Obstet Gynaecol Res.</i> , 40(6), 1668-1673 (2014). | 24888932 | Mouse | uterus | uterine cavity injection | STAT-3 | | | | |

siRNA transfection / miRNA transfection (in vivo)

| No | Author | Reference | PubMed ID | Host | Target organ / tissue | Delivery route | siRNA / miRNA target | siRNA / miRNA dose | HVJ-E dose | dosing strategy | Remarks |
|----|----------------------------|---|-----------|-------------------|--------------------------------|-----------------------------|--|--------------------|------------|---|-------------------------|
| 1 | M. Ito <i>et al.</i> | <i>J. Gene Med.</i> , 7(8), 1044-1052 (2005). | 15756713 | SCID mouse | i.d transplanted tumor (HeLa) | intratumor injection | Rad51 | 35µg | | day 0,2,4 | Day2 CDDP(cisplatin) |
| 2 | S. F Feigl <i>et al.</i> | <i>Nature Med.</i> , 12, 99-106 (2006). | 16327802 | Mouse | lung | intratracheal | IL-13 Receptor α2 | 100µg | | day0,2,4,6,8, 10,12,14,16, 18,20,22 | |
| 3 | K. Ishibashi <i>et al.</i> | <i>J. Dent. Res.</i> , 85(12), 1101-1105 (2006). | 17122162 | Rat | submandibular gland | retrograde ductal injection | rCLCA(Ca2+-dependent cl-channels), CFTR(cystic fibrosis transmembrane conductance regulator) | 2 nmol | 80µL(2AU) | day 0 | |
| 4 | S. F Feigl <i>et al.</i> | <i>J. Immunol.</i> , 178, 5859 - 5870 (2007). | 17442970 | Mouse | colon | intrarectall injection | IL-13 Receptor α2 | | | | |
| 5 | Y. Nimura <i>et al.</i> | <i>Int. J. Oncol.</i> , 30(6), 1477-1484 (2007). | 17487369 | BALB/C nude mouse | i.d transplanted tumor (H1299) | intratumor injection | Ku80 | | | day0(1shot) or day 2, 4(2 shots) | siRNA + 4Gy irradiation |
| 7 | K. Ishibashi <i>et al.</i> | <i>Am J Physiol Regulatory Integrative Comp Physiol.</i> , 294, 1729-1736 (2008). | 18337312 | Rat | submandibular gland | retrograde ductal injection | CFTR (cystic fibrosis transmembrane conductance regulator) | 2 nmol | | | |

| No | Author | Reference | PubMed ID | Host | Target organ / tissue | Delivery route | siRNA/miRNA target | siRNA /miRNA dose | HVJ-E dose | dosing strategy | Remarks |
|----|---------------------------------|--|-----------|-----------------------|---|--|---|-------------------|------------------|-------------------|--|
| 8 | Y. Doi <i>et al.</i> | <i>Proc. Natl. Acad. Sci. USA</i> , 105(24), 8381-8386 (2008). | 18550828 | SJL/J mouse (ex vivo) | inguinal and popliteal LN cells (enrich in lymphoblasts) | adoptive transfer experimental autoimmune encephalomyelitis (EAE) model in irradiated mice/ i.p. injection of NR4A2 siRNA-treated LN cells | orphan nuclear receptor NR4A2 | | | | |
| 9 | H. Kato <i>et al.</i> | <i>J. Exp. Med.</i> , 205, 1601-1610 (2008). | 18591409 | Mouse | | intravenously injection | | | | | transfect short poly I:C , long poly I:C(purpose :dsRNA-induced IFN- β production) |
| 10 | K. Morita <i>et al.</i> | <i>J. Pharmacol. Exp. Ther.</i> , 326, 633-645 (2008). | 18448867 | Mouse | spinal cord | spinal cord injection | GlyT1, GlyT2, GlyRa3 | | | | |
| 11 | M. Boirivant <i>et al.</i> | <i>Gastroenterology</i> , 135(5), 1612-1623 (2008). | 18765239 | Mouse | colon | intrarectal injection | Toll like receptor(TLR)-2 | 1mg | | | |
| 12 | K. Morita <i>et al.</i> | <i>Pain</i> , 138(3), 525-536 (2008). | 18353555 | Mouse | spinal cord | spinal cord injection | GlyR α 3 | | | | |
| 13 | M. Matsuda <i>et al.</i> | <i>Gene Ther.</i> , 16(12), 1465-1476 (2009). | 19675593 | Mouse | i.d transplanted tumor (human glioblastoma cell), intracranial transplanted tumor (human glioblastoma cell) | intratumor injection | Eg5 | | | | |
| 14 | N. Matsuda <i>et al.</i> | <i>J. Pharmacol. Exp. Ther.</i> , 332(3), 730-737 (2010). | 20008488 | Mouse | spleen | tail vein | Histamine H4 Receptors | 50 μ g | | | sepsis induction |
| 15 | T. Watanabe <i>et al.</i> | <i>J. Clin. Invest.</i> , 120(5), 1645-1662 (2010). | 20389019 | Mouse | | i.p | Stat1 | 100 μ g | | | |
| 16 | T.Takahashi <i>et al.</i> | <i>Pain</i> , 150(1), 183-191 (2010). | 20546998 | Rat | | intrathecal(i.t) injection | Ca $_v$ 3.2 | 9 μ g/1shot | | | Total siRNA dose:27 μ g |
| 17 | E.Tskitishvili <i>et al.</i> | <i>Am. J. Obstet. Gynecol.</i> , 203(4), 364.e6-e12 (2010). | 20579953 | Mouse | uterus | uterine cavity | RCAS1 | | | | |
| 18 | T. Fujioka <i>et al.</i> | <i>J. Pharmacol. Sci.</i> , 113(4), 353-361(2010). | 20647689 | Mouse | transplanted tumor (colon26) | Intratumor injection | bcl-2 | 40 μ g/1shot | 40 μ L/1shot | day 0,2,4,6,8 | HRE-CMV sh bcl-2 (Plasmid) |
| 19 | L. Chen <i>et al.</i> | <i>Circulation</i> , 122, 910-919 (2010). | 20713899 | Mouse | dorsal skin | subcutaneous injection | Int6 | 40 μ g | | | siRNA-Int6 plasmid |
| 20 | R. Naono-Nakayama <i>et al.</i> | <i>Eur. J. Pharmacol.</i> , 670, 448-457(2011). | 21958872 | Rat | dorsal horn | intrathecal injection | NK1 receptor | 45pmol/1shot | | day 0 | |
| 21 | Y. Mitsuishi <i>et al.</i> | <i>Cancer Cell</i> , 22(1), 66-79 (2012). | 22789539 | Mouse | transplanted tumor(A549) | intratumor injection | Nrf2 | | | day 1,2,3 | |
| 22 | J. Jin <i>et al.</i> | <i>Am. J. Transl. Res.</i> , 4(3), 302-315 (2012). | 22937208 | Mouse | | intracerebroventricular (ICV) injection | CD45 | 5 μ g | | | shRNA |
| 23 | E. Kiyohara <i>et al.</i> | <i>Gene Ther.</i> , 19(7), 734-741(2012). | 21900962 | Mouse | transplanted tumor(B16-F10) | intratumor injection | Rad51 | 2.5nmol | | day 6,8,10 | |
| 24 | N. Motoyama <i>et al.</i> | <i>Eur. J. Pain</i> , 17(8), 1156-1167 (2013). | 23355413 | Mouse | | intratumor injection | GlyRa3 siRNA | | | | |
| 25 | T. Kitayama <i>et al.</i> | <i>Molecular Pain</i> , 9, 23 (2013). | 23639135 | Mouse | spinal cord | spinal cord injection | Phospholipase C-related but catalytical inactive protein (PRIP) | 0.45pmol | 5 μ L/1shot | | |
| 26 | SM.Brunner <i>et al.</i> | <i>Transplant Res.</i> , 2(1), 16 (2013). | 24143891 | Mouse | | intrapitoneal injection | IL-13Ra2 | | | | |
| 27 | M. Fujiya <i>et al.</i> | <i>Oncogene</i> , 33(40) 4847-4856 (2014). | 24166503 | Mouse | transplanted tumor (SW620) | intratumor injection | miR-18a [miRNA] | | | day 0,1,2,3,4,5,6 | |
| 28 | K. Morita <i>et al.</i> | <i>PLoS One</i> . 9(3), e91746 (2014). | 24637403 | Mouse | spinal cord | spinal cord injection | PAF receptor | 0.45pmol | | | |

| No | Author | Reference | PubMed ID | Host | Target organ / tissue | Delivery route | siRNA/miRNA target | siRNA / miRNA dose | HVJ-E dose | dosing strategy | Remarks |
|----|--------------------|--|------------|---------------|---|---|---|--------------------|------------|-----------------|---|
| 29 | M. Imajo et al. | Nature Cell Biology 17,7-19 (2015). | 25531778 | Mouse | intestinal epithelium | intestinal lumen | Mouse YAP,WWTR1, Stk4(Mst1),Stk3(Mst2) | 20µM | | | |
| 30 | LQ. Beach et al. | J. Neuroendocrinol., (5) 324-334(2015). | 25531778 | Zebra finch | LMAN(lateral magnocellular nucleus of the anterior nidopallium) | Injections into the LMAN | TBCA siRNA | | | | |
| 31 | Y. Nakamura et al. | J. Neurosci. Res., 93(4) 584-591(2015). | 25400139 | Mouse | spinal lumbar dorsal horn | intrathecal injection | Connexin 36 (Cx36) siRNA | | | | |
| 32 | N. Morioka et al. | Brain Behav. Immun., 49, 293-310 (2015). | 26116449 | Mouse | spinal lumbar dorsal horn | intrathecal injection | Connexin 43 (Cx43) siRNA | | | | |
| 33 | N. Morioka et al. | Mol. Cell Neurosci., 72, 72-83 (2016). | 26808220 | Mouse | spinal lumbar dorsal horn | intrathecal injection | Mouse Per1(period1) siRNA | | | | |
| 34 | T. Kitayama et al. | Neurochem. Int., 101,120-131 (2016). | 27818163 | Mouse | | intrathecal injection | ZnT1(zinc transporter1) siRNA | 0.45pmol | | | |
| 35 | LQ. Beach et al. | Brain Res., 1642, 467-477 (2016). | 27086969 | Zebra finches | Brain | local injection | TrkB siRNA | 30pmol | | | |
| 36 | Y. Hayano et al. | J. Exp. Med., 213(13), 2949-2966(2016). | 27856613 | Rat | spinal cord neurons | intrathecal injection | Unc5B siRNA or Netrin-4 siRNA | | | | |
| 37 | S. Kon et al. | Nature Cell Biology, 19, 530-541(2017) . | 28414314 | Mouse | intestinal epithelium | intestinal lumen | PKD4 siRNA | | | | iGT (intestine-specific gene transfer) system |
| 38 | L. Zhan et al. | Cell Death Dis., 8(7) e2949 (2017). | 28726776 | Rat | hippocampal CA1 region | local injection | UVRAG siRNA | | | | |
| 39 | K. Yamamoto et al. | Mol. Pain. 14, 17448069188199422018 (2018). | PMC6305955 | Mouse | lumbar enlargement of spinal cord | intrathecal catheter | mouse TRPV2 siRNA | 5 ug/10 ul. | | day 14, 15 ,16 | |
| 40 | L. Yang et al. | J.Transl. Med., 17(1),433 (2019). | 31888653 | Rat | Basilar Artery | Cisterna magna injection | Cx34 siRNA | 5pg/10 ul. | | | Pretreatment |
| 41 | M. Higaki et al. | In Vitro Cell Dev Biol Anim., 56(3), 222-233 (2020). | 32185608 | SCID mouse | i.d transplanted tumor (A431) | | miR-6887-5p | | | | |
| 42 | H. Konishi et al. | Cell Death Dis., 11(4),245 (2020). | 32303675 | Mouse | transplanted tumor (HCT116) /AOM-DSS carcinogenesis Mouse model | intratumor injection/ intraperitoneal injection | HNRNP A0 siRNA / HNRNP A0 siRNA or RAB3GAP1 | | | | |

Protein (antibody) transfection (in vivo)

| No | Author | Reference | PubMed ID | Host | Target organ / tissue | Delivery route | Protein/Antibody | protein dose | HVJ-E dose | dosing strategy | Remarks |
|----|---------------------------|---|-----------|-------|------------------------------------|---------------------------------------|-------------------|--------------|------------|------------------------------|-----------------|
| 1 | K. Owada-Makabe et al. | Neurosci. Lett., 378(1), 18-21 (2005). | 15763165 | Rat | brain (nucleus tractus solitarius) | local injection (with microinjection) | β-galactosidase | 16.7ng | 0.003 AU | day 0 | |
| 2 | E. Yasuoka et al. | J. Mol. Med., 85(3), 279-288 (2007). | 17072578 | Mouse | nasal cavity | intranasal | OVA (ovalbumin) | 9.1µg | | day 35, 42, 49 | protein vaccine |
| 3 | K. Shintani-Ishida et al. | Biochim.Biophys.Acta., 1812(7), 743-751 (2011). | 21447388 | Rat | heart | local injection | anti-PLB antibody | | | | |
| 4 | K. Shintani-Ishida et al. | J.Mol. Cell.Cardiol., 53(2), 233-239(2012). | 22659291 | Rat | heart | local injection | anti-PLN antibody | 6.3 µg /rat | 0.3 AU | 4 sites (50 µl at each site) | |

Plasmid DNA transfection (in vivo)

| No | Author | Reference | PubMed ID | Host | Target organ / tissue | Delivery route | Plasmid DNA | DNA dose | HVJ-E dose | dosing strategy | Remarks |
|----|--------------------|---|-----------|---------------------------------|-----------------------|---|-------------------------------------|----------|------------|-----------------|--|
| 1 | H. Nakamura et al. | Mol. Hum. Reprod., 9(10), 603-609 (2003). | 12970398 | IVCS mouse(day 1.5 post coitum) | uterus | uterine cavity | LacZ Luciferase | 80µg | | 25µL | After transfection, the cervix was clamped for 10min. HVJ-E-plasmid complex was finally suspended in human tubal fluid(HTF) medium |
| 2 | K. Oshima et al. | FASEB J., 18(1), 212-214 (2003). | 14630698 | Rat | inner ear | intrathecal injection (cerebrospinal fluid:CSF) | human HGF(Hepatocyte growth factor) | | | day 0, 14 | |

| No | Author | Reference | PubMed ID | Host | Target organ / tissue | Delivery route | Plasmid DNA | DNA dose | HVJ-E dose | dosing strategy | Remarks |
|----|----------------------------|---|-----------|--------------------------------------|-------------------------------|---|--|----------|------------|--|---|
| 3 | H. Kanzaki <i>et al.</i> | <i>J. Dent. Res.</i> , 83(12), 920-925 (2004). | 15557398 | Wistar Rat | sub-perosteal area | periodontal tissue | OPG(Osteoprotegerin) | | | day 0, 3, 7, 10, 14 and 17. 5µL(1shot) | |
| 4 | M. Ono <i>et al.</i> | <i>Circulation</i> , 110, 2896-2902 (2004). | 15505094 | Wistar Rat | lung | left lung (with catheter) | Lac Z,human HGF(Hepatocyte growth factor) | 60µg | | 300µL | pulmonary Hypertension(PH)model mouse(with MCT) |
| 5 | H. Nakamura <i>et al.</i> | <i>Biochem. Biophys. Res. Commun.</i> , 321(4), 886-892 (2004). | 15358109 | Mouse | uterus | uterine cavity | IkBa Mutant | 80µg | | 25µL | After transfection, the cervix was clamped for 10min. HVJ-E-plasmid complex was finally suspended in human tubal fluid(HTF) medium |
| 6 | M. Takeno <i>et al.</i> | <i>Clin. Exp. Allergy</i> , 34(6), 965-970 (2004). | 15196287 | BALB/C mouse | spleen | intravenous injection(tail vein) | mouse tkk (a member of Tec family tyrosine kinases) | 50µg | | day -1,+1,+3,+20,+22,+24 | Day 0 = First immunization mouse tkk is a member of Tec family tyrosine kinases, acts Th-1-specific transcription factor in the T lymphocytes.) |
| 7 | T. Yamazaki <i>et al.</i> | <i>Blood</i> , 104(8), 2345-2352 (2004). | 15187024 | C57BL/6 mouse | abdominal subcutaneous tissue | abdominal subcutaneous tissue | PILSAP(puromycin-insensitive leucyl-specific aminopeptidase) | 20µg | 40µL(1AU) | | intra-matrigel injection |
| 8 | M. Shimamura <i>et al.</i> | <i>Circulation</i> , 109, 424-431 (2004). | 14707023 | Wistar Rat | brain | cisterna magna injection(with cannula) | human HGF(Hepatocyte growth factor) | 400µg | | 100µL | After removal 100µL of cerebrospinal fluid(CSF),HVJ-E-plasmid complex infused.Rats were placed head down for 30min. |
| 9 | T. Itani <i>et al.</i> | <i>Int.J. Mol. Med.</i> , 16, 821-825(2005). | 16211250 | S D rat (MRP2 mutant) | liver | peripheral portal vein | human MRP2(Multidrug resistance protein 2) | 700µg | 1mL(25AU) | | SD rat (MRP2 mutant; Eisai hyperbilirubinuria rat) |
| 10 | T. Matsuoka <i>et al.</i> | <i>Diabetes</i> , 54, 2882-2890 (2005). | 16186389 | Wistar Rat(STZ induced diabetic Rat) | carotid artery | carotid artery | Tim44(Mammalian translocase of inner mitochondria membrane 44) | 20µg | 2AU | 100µL | Neo,After balloon injury,HVJ-E-plasmid complex incubated in the carotid artery for 20min. |
| 11 | M. Ono <i>et al.</i> | <i>J. Thorac. Cardiovasc. Surg.</i> , 129, 740-745 (2005). | 15821638 | neonatal pig (piglet) | lung | left pulmonary artery with balloon | human HGF(Hepatocyte growth factor) | 2mg | | 20mL (1shot) | HVJ-E-plasmid complex was infused via the catheter, after the occlusion of the left pulmonary artery flow by balloon inflation for 3 minutes. |
| 12 | N. Shigemura <i>et al.</i> | <i>Circulation</i> , 111, 1407-1414 (2005). | 15781752 | SD rat | lung | dorsalis Penis Superficialis vein(via the catheter) | human HGF(Hepatocyte growth factor) | 100µg | | 0.5mL(1shot) | |
| 13 | N. Shigemura <i>et al.</i> | <i>Am. J. Respir. Crit. Care Med.</i> , 171, 1237-1245 (2005). | 15764723 | Rat | lung | dorsalis Penis Superficialis vein | human HGF(Hepatocyte growth factor) | 100µg | | 0.5mL(1shot) | |

| No | Author | Reference | PubMed ID | Host | Target organ / tissue | Delivery route | Plasmid DNA | DNA dose | HVJ-E dose | dosing strategy | Remarks |
|----|----------------------------|---|-----------|--|--|--|--|----------|------------|--|---|
| 14 | H. Futamatsu <i>et al.</i> | <i>Circ. Res.</i> , 96, 823-830 (2005). | 15774858 | Lewis rat | heart | heart | human HGF(Hepatocyte growth factor) | 20µg | 200µL(5AU) | day 0,14. (50µL×4sites) | |
| 15 | T. Watanabe <i>et al.</i> | <i>J. Clin. Invest.</i> , 120(5), 1645-1662 (2010). | 20389019 | Mouse | | ip | Stat1 | 100µg | | | |
| 16 | Y. D. Kim <i>et al.</i> | <i>Gene Ther.</i> , 13(3), 216-224 (2006). | 16177820 | SD rat | | liver | pEBAct-ins(human insulin+EBV origin of replication+ the EBV nuclear antigen EBNA-1 +amp-resistance gene) | 100µg | | 1 shot(four sites) | right lobe margin of the liver |
| 17 | H. Kanzaki <i>et al.</i> | <i>Gene Ther.</i> , 13(8), 678-685 (2006). | 16397507 | Wistar rat | palatal periodonal tissue of upper first molar | palatal periodonal tissue of upper first molar | mouse RANKL(receptor activator of nuclear factor kappa B ligand) | | | day 0, 3, 7, 10, 14 and 17. 5µL(1shot) | |
| 18 | H. Suzuki <i>et al.</i> | <i>Cancer Biol. Ther.</i> , 5(11), 1487-1491 (2006). | 17102594 | Nude KSN/Sic mouse | i.d transplanted tumor (LoVo:human colon cancer cell line) | intratumor injection | N116-cdel2(dominant negative RAS Mutant) | 75µg | | day 3,10(after transplantation) | 1×10 ⁷ LoVo cells were subcutaneously injected into the back of nude mouse. |
| 19 | Y. Zhang <i>et al.</i> | <i>J. Am. Soc. Nephrol.</i> , 17, 1090-1101 (2006). | 16510762 | CD-1 mouse (STZinduced diabetic mouse) | kidney | tail vein injection | LacZ,Tim44(Mammalian translocase of inner mitochondrial membrane 44) | 80µg | 8 AU | 120µL (1shot) | STZ(150mg/kg)induced diabetic mouse |
| 20 | M. Ieda <i>et al.</i> | <i>Circulation</i> , 114, 2351-2363(2006). | 17101855 | diabetic mellitus induced rat | heart | local injection | NGF(Nerve growth factor) | 50 µg | | | |
| 21 | T. Hamada <i>et al.</i> | <i>Am. J. Pathol.</i> , 171,872-881 (2007). | 17640959 | SD rat | spleen | local injection | Oncostatin M (OSM) | | | day 4, 11,18 | Liver Damage Induced by Dimethylnitrosamine(DMN) in Rats |
| 22 | T. Watanabe <i>et al.</i> | <i>J. Clin. Invest.</i> , 118(2), 545-559 (2008). | 18188453 | Mouse | colon | i.p. | NOD-2(Nucleotide-binding oligomerization domain 2) | 100µg | | day-2,-1,-0,1 | MDP(muramyl dipeptide) |
| 23 | Y. Mitani <i>et al.</i> | <i>J. Thorac. Cardiovasc. Surg.</i> , 136(1), 142-149 (2008). | 18603067 | Rat | lung | intratracheal injection | Atrial natriuretic peptide gene and β-galactosidase gene | | | | |
| 24 | H. Matsubara <i>et al.</i> | <i>Clin Orthop Relat Res.</i> 466(12), 2962-2672 (2008). | 18813894 | Japanese white Rabbit(2.5-3kg) | osteotomy gap of rabbit tibia | Subcutaneous injection(S.c) | human HGF(Hepatocyte growth factor) | 50µg | 5AU | postoperative 2 weeks | final volume of 100µL balance salt solution for S.C |
| 25 | M. Okada <i>et al.</i> | <i>Vaccine</i> , 27, 3267-3270 (2009). | 19200841 | Mouse | | Intramuscular (i.m) injection | HSP65(mycobacterial heat shock protein 65) and IL-12(interleukin-12) | 50µg | | | DNA tuberculosis vaccine |
| 26 | T. Fujita <i>et al.</i> | <i>Cancer Res.</i> , 69(12), 5142-5150 (2009). | 19491278 | Mouse | | Intramuscular (i.m) injection | TGFR plasmid(TGF-beta type II receptor fused to the human IgG heavy chain) | | | | DNA vaccine C57BL/6 mice subcutaneously bearing E.G7 tumors were administered TGFR plasmid DNA i.m. near the established tumor. |

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|----|----------------------------|---|-----------|-------|-----------------------|--|--|----------|------------|-----------------------|--------------------------------|
| 27 | H. Kidoya <i>et al.</i> | <i>Blood.</i> 115(15), 3166-3174 (2010). | 20185589 | Mouse | | quadriceps muscle of the ischemic limb | P-CAG-Lacz, P-CAG-VEGF P-CG-Apelin | | | | |
| 29 | M. Tomomura <i>et al.</i> | <i>In Vivo</i> , 25, 157-163 (2011). | 21471529 | Mouse | | Intramuscular (i.m) injection | plasmid(Flag-tagged caldecrin gene) | | | | |
| 30 | M. Okada <i>et al.</i> | <i>Clin. Dev. Immunol.</i> , 549281 (2011) | 21437226 | Mouse | | anterior muscles in the tibia | HSP65(mycobacterial heat shock protein 65) and IL-12(interleukin-12) | 50µg | 100µL | 3 times every 3 weeks | DNA tuberculosis vaccine |
| 31 | M. S. Salker <i>et al.</i> | <i>Nature Med.</i> , 17, 1509-1513 (2011). | 22001908 | Mouse | uterus | | SGK-S422DpIRES2eGFP | 10µg | 100µL | | |
| 32 | N. Zhao <i>et al.</i> | <i>Am.J.Orthod Dentofacial Orthop.</i> , 141, 30-40 (2012). | 22196183 | Rat | | palatal mucosa adjacent to the distal surface of the maxillary right first molar | OPG(Osteoprotegerin) | | | | |
| 33 | N. Zhao <i>et al.</i> | <i>Orthod. Craniofac. Res.</i> , 15(1),10-20 (2012). | 22264323 | Rat | | palatal mucosa adjacent to the mesial surface of the upper right first molar | OPG(Osteoprotegerin) | | | | |
| 34 | H. Kanzaki <i>et al.</i> | <i>J. Biol. Chem.</i> , 288(32), 23009-23020 (2013). | 23801334 | Mouse | | the midline of the skull located between the eyes | Nrf2 expression plasmid | | | Day 1, 3, 5, 7, 9 | |
| 35 | K. Hasegawa <i>et al.</i> | <i>Nature Medicine</i> , 19, 1496-1504 (2013). | 24141423 | Mouse | Podocyte | tail vein injection | Mouse Claudin-1 | 50µg | | 120µL | human NPHS2 (podocin) promoter |
| 36 | T. Watanabe <i>et al.</i> | <i>Mucosal Immunology</i> , 7(6), 1312-1325(2014). | 24670424 | Mouse | | intrarectal instillation | FLAG-tagged IRF4 | | | | |
| 37 | M. Imajo <i>et al.</i> | <i>Nature Cell Biology</i> 17,7-19 (2015). | 25531778 | Mouse | intestinal epithelium | intestinal lumen | | 30µg | | | |
| 38 | SL. Lin <i>et al.</i> | <i>Transl Stroke Res.</i> 4, 413-427 (2019). | 30191468 | Rat | | ballon denudation to rat carotid artery | Extracellular superoxide dismutase (EC-SOD) | | | | |

Bioimaging (in vivo)

| No | Author | Reference | PMID | Host | Target organ / tissue | Delivery route | Magnetic labeling etc | dose | HVJ-E dose | dosing strategy | Remarks |
|----|---------------------------|---|----------|--------|-----------------------|-------------------------|--|------|------------|-----------------|-----------------------------------|
| 1 | J A Flexman <i>et al.</i> | <i>IEEE Trans Nanobioscience</i> , 7(3), 223-232(2008). | 18779103 | SD Rat | liver, kidney, spleen | intravenously injection | Feridex (superparamagnetic iron oxide particles) + ¹⁸ F-fluoride + poly-L-lysine | | | | PET(Positron Emission Tomography) |

Review

| No | Author | Reference | PubMed ID | Remarks |
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