



Expression Lentivirus for Luciferase (Firefly, Renilla, Cypridina, Red-Luc)

1. Firefly Luciferase Lentivirus:

| Cat# | Product Name | Amounts |
|-----------------------------|--|---|
| LVP326 | CMV-Luciferase (firefly) (Bsd) | 200ul, ~1 x 10 ⁷ IFU/mL in DMEM containing 10% FBS |
| LVP326-PBS | CMV-Luciferase (firefly) (Bsd), in vivo ready | 200ul, ~5 x 10 ⁷ IFU/mL in PBS |
| LVP325 | CMV-Luciferase (firefly) (Puro) | 200ul, ~1 x 10 ⁷ IFU/mL in DMEM containing 10% FBS |
| LVP325-PBS | CMV-Luciferase (firefly) (Puro), in vivo ready | 200ul, ~5 x 10 ⁷ IFU/mL in PBS |
| LVP283 | CMV-Luciferase (firefly) (Neo) | 200ul, ~1 x 10 ⁷ IFU/mL in DMEM containing 10% FBS |
| LVP283-PBS | CMV-Luciferase (firefly) (Neo), in vivo ready | 200ul, ~5 x 10 ⁷ IFU/mL in PBS |
| LVP1222 | CMV-Luciferase (firefly) (Zeo) | 200ul, ~1 x 10 ⁷ IFU/mL in DMEM containing 10% FBS |
| LVP1222-PBS | CMV-Luciferase (firefly) (Zeo), in vivo ready | 200ul, ~5 x 10 ⁷ IFU/mL in PBS |
| LVP1238 | CMV-Luciferase (firefly) (Hygro) | 200ul, ~1 x 10 ⁷ IFU/mL in DMEM containing 10% FBS |
| LVP1238-PBS | CMV-Luciferase (firefly) (Hygro), in vivo ready | 200ul, ~5 x 10 ⁷ IFU/mL in PBS |
| LVP323 | CMV-Luciferase (firefly)- 2A-GFP (Bsd) | 200ul, ~1 x 10 ⁷ IFU/mL in DMEM containing 10% FBS |
| LVP323-PBS | CMV-Luciferase (firefly)- 2A-GFP (Bsd), in vivo ready | 200ul, ~5 x 10 ⁷ IFU/mL in PBS |
| LVP020 | CMV-Luciferase (firefly)- 2A-GFP (Puro) | 200ul, ~1 x 10 ⁷ IFU/mL in DMEM containing 10% FBS |
| LVP020-PBS | CMV-Luciferase (firefly)- 2A-GFP (Puro), in vivo ready | 200ul, ~5 x 10 ⁷ IFU/mL in PBS |
| LVP403 | CMV-Luciferase (firefly)- 2A-GFP (Neo) | 200ul, ~1 x 10 ⁷ IFU/mL in DMEM containing 10% FBS |
| LVP403-PBS | CMV-Luciferase (firefly)- 2A-GFP (Neo), in vivo ready | 200ul, ~5 x 10 ⁷ IFU/mL in PBS |
| LVP461 | CMV-Luciferase (firefly)- 2A-GFP (RFP-Bsd) | 200ul, ~1 x 10 ⁷ IFU/mL in DMEM containing 10% FBS |



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| LVP461-PBS | CMV-Luciferase (firefly)-2A- GFP (RFP-Bsd), in vivo ready | 200ul, ~5 x 10 ⁷ IFU/mL in PBS |
| LVP462 | CMV-Luciferase (firefly)-2A- GFP (RFP-Puro) | 200ul, ~1 x 10 ⁷ IFU/mL in DMEM containing 10% FBS |
| LVP462-PBS | CMV-Luciferase (firefly)-2A- GFP (RFP-Puro), in vivo ready | 200ul, ~5 x 10 ⁷ IFU/mL in PBS |
| LVP009 | CMV-Luciferase (firefly)-2A- RFP (Bsd) | 200ul, ~1 x 10 ⁷ IFU/mL in DMEM containing 10% FBS |
| LVP009-PBS | CMV-Luciferase (firefly)-2A- RFP (Bsd), in vivo ready | 200ul, ~5 x 10 ⁷ IFU/mL in PBS |
| LVP324 | CMV-Luciferase (firefly)-2A- RFP (Puro) | 200ul, ~1 x 10 ⁷ IFU/mL in DMEM containing 10% FBS |
| LVP324-PBS | CMV-Luciferase (firefly)-2A- RFP (Puro), in vivo ready | 200ul, ~5 x 10 ⁷ IFU/mL in PBS |
| LVP402 | CMV-Luciferase (firefly)-2A- RFP (Neo) | 200ul, ~1 x 10 ⁷ IFU/mL in DMEM containing 10% FBS |
| LVP402-PBS | CMV-Luciferase (firefly)-2A- RFP (Neo), in vivo ready | 200ul, ~5 x 10 ⁷ IFU/mL in PBS |
| LVP806 | CMV-Luciferase (firefly)-2A- GFP | 200ul, ~1 x 10 ⁷ IFU/mL in DMEM containing 10% FBS |
| LVP806-PBS | CMV-Luciferase (firefly)-2A- GFP , in vivo ready | 200ul, ~5 x 10 ⁷ IFU/mL in PBS |
| LVP807 | CMV-Luciferase (firefly)-2A- RFP | 200ul, ~1 x 10 ⁷ IFU/mL in DMEM containing 10% FBS |
| LVP807-PBS | CMV-Luciferase (firefly)-2A- RFP , in vivo ready | 200ul, ~5 x 10 ⁷ IFU/mL in PBS |
| LVP911a | CMV-Luciferase (firefly) (no marker) | 200ul, ~1 x 10 ⁷ IFU/mL in DMEM containing 10% FBS |
| LVP911a-PBS | CMV-Luciferase (firefly), in vivo ready (No marker) | 200ul, ~5 x 10 ⁷ IFU/mL in PBS |
| LVP433 | EF1a -Luciferase (firefly) (Bsd) | 200ul, ~1 x 10 ⁷ IFU/mL in DMEM containing 10% FBS |
| LVP433-PBS | EF1a -Luciferase (firefly) (Bsd), in vivo ready | 200ul, ~5 x 10 ⁷ IFU/mL in PBS |
| LVP434 | EF1a -Luciferase (firefly) (Puro) | 200ul, ~1 x 10 ⁷ IFU/mL in DMEM containing 10% FBS |
| LVP434-PBS | EF1a -Luciferase (firefly) (Puro), in vivo ready | 200ul, ~5 x 10 ⁷ IFU/mL in PBS |
| LVP435 | EF1a -Luciferase (firefly) (Neo) | 200ul, ~1 x 10 ⁷ IFU/mL in DMEM containing 10% FBS |
| LVP435-PBS | EF1a -Luciferase (firefly) (Neo), in vivo ready | 200ul, ~5 x 10 ⁷ IFU/mL in PBS |



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| LVP1223 | EF1a-Luciferase (firefly) (Zeo) | 200ul, ~1 x 10 ⁷ IFU/mL in DMEM containing 10% FBS |
| LVP1223-PBS | EF1a-Luciferase (firefly) (Zeo), in vivo ready | 200ul, ~5 x 10 ⁷ IFU/mL in PBS |
| LVP1239 | EF1a-Luciferase (firefly) (Hygro) | 200ul, ~1 x 10 ⁷ IFU/mL in DMEM containing 10% FBS |
| LVP1239-PBS | EF1a-Luciferase (firefly) (Hygro), in vivo ready | 200ul, ~5 x 10 ⁷ IFU/mL in PBS |
| LVP436 | EF1a-Luciferase (firefly)- 2A- GFP (Bsd) | 200ul, ~1 x 10 ⁷ IFU/mL in DMEM containing 10% FBS |
| LVP436-PBS | EF1a-Luciferase (firefly)- 2A- GFP (Bsd) , in vivo ready | 200ul, ~5 x 10 ⁷ IFU/mL in PBS |
| LVP437 | EF1a-Luciferase (firefly)- 2A- GFP (Puro) | 200ul, ~1 x 10 ⁷ IFU/mL in DMEM containing 10% FBS |
| LVP437-PBS | EF1a-Luciferase (firefly)- 2A- GFP (Puro) , in vivo ready | 200ul, ~5 x 10 ⁷ IFU/mL in PBS |
| LVP438 | EF1a-Luciferase (firefly)- 2A- GFP (Neo) | 200ul, ~1 x 10 ⁷ IFU/mL in DMEM containing 10% FBS |
| LVP438-PBS | EF1a-Luciferase (firefly)- 2A- GFP (Neo) , in vivo ready | 200ul, ~5 x 10 ⁷ IFU/mL in PBS |
| LVP439 | EF1a-Luciferase (firefly)- 2A- RFP (Bsd) | 200ul, ~1 x 10 ⁷ IFU/mL in DMEM containing 10% FBS |
| LVP439-PBS | EF1a-Luciferase (firefly)- 2A- RFP (Bsd) , in vivo ready | 200ul, ~5 x 10 ⁷ IFU/mL in PBS |
| LVP440 | EF1a-Luciferase (firefly)- 2A- RFP (Puro) | 200ul, ~1 x 10 ⁷ IFU/mL in DMEM containing 10% FBS |
| LVP440-PBS | EF1a-Luciferase (firefly)- 2A- RFP (Puro) , in vivo ready | 200ul, ~5 x 10 ⁷ IFU/mL in PBS |
| LVP441 | EF1a-Luciferase (firefly)- 2A- RFP (Neo) | 200ul, ~1 x 10 ⁷ IFU/mL in DMEM containing 10% FBS |
| LVP441-PBS | EF1a-Luciferase (firefly)- 2A- RFP (Neo) , in vivo ready | 200ul, ~5 x 10 ⁷ IFU/mL in PBS |
| LVP463 | EF1a-Luc (firefly)- 2A- GFP (RFP-Bsd) | 200ul, ~1 x 10 ⁷ IFU/mL in DMEM containing 10% FBS |
| LVP463-PBS | EF1a-Luc (firefly)- 2A- GFP (RFP-Bsd) , in vivo ready | 200ul, ~5 x 10 ⁷ IFU/mL in PBS |
| LVP464 | EF1a-Luc (firefly)- 2A- GFP (RFP-Puro) | 200ul, ~1 x 10 ⁷ IFU/mL in DMEM containing 10% FBS |
| LVP464-PBS | EF1a-Luc (firefly)- 2A- GFP (RFP-Puro) , in vivo ready | 200ul, ~5 x 10 ⁷ IFU/mL in PBS |
| LVP1060 | EF1a-Luciferase (firefly)- 2A- GFP | 200ul, ~1 x 10 ⁷ IFU/mL in DMEM containing 10% FBS |



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| LVP1060-PBS | EF1a -Luciferase (firefly)- 2A- GFP , in vivo ready | 200ul, ~5 x 10 ⁷ IFU/mL in PBS |
| LVP1061 | EF1a -Luciferase (firefly)- 2A- RFP | 200ul, ~1 x 10 ⁷ IFU/mL in DMEM containing 10% FBS |
| LVP1061-PBS | EF1a -Luciferase (firefly)- 2A- RFP , in vivo ready | 200ul, ~5 x 10 ⁷ IFU/mL in PBS |
| LVP911b | EF1a -Luciferase (firefly) (no marker) | 200ul, ~1 x 10 ⁷ IFU/mL in DMEM containing 10% FBS |
| LVP911b-PBS | EF1a -Luciferase (firefly), in vivo ready (No marker) | 200ul, ~5 x 10 ⁷ IFU/mL in PBS |
| LVP567 | CAG -Luciferase (firefly) (Puro) | 200ul, ~1 x 10 ⁷ IFU/mL in DMEM containing 10% FBS |
| LVP567-PBS | CAG -Luciferase (firefly) (Puro), in vivo ready | 200ul, ~5 x 10 ⁷ IFU/mL in PBS |
| LVP568 | CAG -Luciferase (firefly) (Bsd) | 200ul, ~1 x 10 ⁷ IFU/mL in DMEM containing 10% FBS |
| LVP568-PBS | CAG -Luciferase (firefly) (Bsd), in vivo ready | 200ul, ~5 x 10 ⁷ IFU/mL in PBS |
| LVP569 | CAG -Luciferase (firefly) (Neo) | 200ul, ~1 x 10 ⁷ IFU/mL in DMEM containing 10% FBS |
| LVP569-PBS | CAG -Luciferase (firefly) (Neo), in vivo ready | 200ul, ~5 x 10 ⁷ IFU/mL in PBS |
| LVP570 | CAG -Luciferase (firefly) (GFP -Puro) | 200ul, ~1 x 10 ⁷ IFU/mL in DMEM containing 10% FBS |
| LVP570-PBS | CAG -Luciferase (firefly), (GFP -Puro), in vivo ready | 200ul, ~5 x 10 ⁷ IFU/mL in PBS |
| LVP571 | CAG -Luciferase (firefly) (RFP -Bsd) | 200ul, ~1 x 10 ⁷ IFU/mL in DMEM containing 10% FBS |
| LVP571-PBS | CAG -Luciferase (firefly), (RFP -Bsd), in vivo ready | 200ul, ~5 x 10 ⁷ IFU/mL in PBS |
| LVP572 | CAG -Luciferase (firefly) (RFP -Puro) | 200ul, ~1 x 10 ⁷ IFU/mL in DMEM containing 10% FBS |
| LVP572-PBS | CAG -Luciferase (firefly), (RFP -Puro), in vivo ready | 200ul, ~5 x 10 ⁷ IFU/mL in PBS |
| LVP304 | Luciferase-2A-NLS-CRE (Bsd) lentiviral particles | 1x10 ⁷ IFU/ml x 200ul in DMEM with 10% FBS |
| LVP304-PBS | Luciferase-2A-NLS-CRE (Bsd) lentiviral particles, in vivo ready | 5 x10 ⁷ IFU/ml x 200ul In PBS |
| LVP409 | Luciferase-2A-NLS-CRE (Puro) lentiviral particles | 1x10 ⁷ IFU/ml x 200ul in DMEM with 10% FBS |
| LVP409-PBS | Luciferase-2A-NLS-CRE (Puro) lentiviral particles, in vivo ready | 5 x10 ⁷ IFU/ml x 200ul In PBS |



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| LVP410 | Luciferase-2A-NLS-CRE (Neo) lentiviral particles | 1x10 ⁷ IFU/ml x 200ul in DMEM with 10% FBS |
| LVP410-PBS | Luciferase-2A-NLS-CRE (Neo) lentiviral particles, in vivo ready | 5 x10 ⁷ IFU/ml x 200ul In PBS |
| LVP411 | Luciferase-2A-NLS-CRE (GFP-Bsd) lentiviral particles | 1x10 ⁷ IFU/ml x 200ul in DMEM with 10% FBS |
| LVP411-PBS | Luciferase-2A-NLS-CRE (GFP-Bsd) lentiviral particles, in vivo ready | 5 x10 ⁷ IFU/ml x 200ul In PBS |
| LVP412 | Luciferase-2A-NLS-CRE (GFP-Puro) lentiviral particles | 1x10 ⁷ IFU/ml x 200ul in DMEM with 10% FBS |
| LVP412-PBS | Luciferase-2A-NLS-CRE (GFP-Puro) lentiviral particles, in vivo ready | 5 x10 ⁷ IFU/ml x 200ul In PBS |
| LVP413 | Luciferase-2A-NLS-CRE (RFP-Bsd) lentiviral particles | 1x10 ⁷ IFU/ml x 200ul in DMEM with 10% FBS |
| LVP413-PBS | Luciferase-2A-NLS-CRE (RFP-Bsd) lentiviral particles, in vivo ready | 5 x10 ⁷ IFU/ml x 200ul In PBS |
| LVP414 | Luciferase-2A-NLS-CRE (RFP-Puro) lentiviral particles | 1x10 ⁷ IFU/ml x 200ul in DMEM with 10% FBS |
| LVP414-PBS | Luciferase-2A-NLS-CRE (RFP-Puro) lentiviral particles, in vivo ready | 5 x10 ⁷ IFU/ml x 200ul In PBS |
| LVP1235 | mPGK-Luciferase (firefly) (Puro) | 200ul, ~1 x 10 ⁷ IFU/mL in DMEM containing 10% FBS |
| LVP1235-PBS | mPGK-Luciferase (firefly) (Puro), in vivo ready | 200ul, ~5 x 10 ⁷ IFU/mL in PBS |
| LVP1236 | Ubc-Luciferase (firefly) (Puro) | 200ul, ~1 x 10 ⁷ IFU/mL in DMEM containing 10% FBS |
| LVP1236-PBS | Ubc-Luciferase (firefly) (Puro), in vivo ready | 200ul, ~5 x 10 ⁷ IFU/mL in PBS |
| LVP1237 | ActB-Luciferase (firefly) (Puro) | 200ul, ~1 x 10 ⁷ IFU/mL in DMEM containing 10% FBS |
| LVP1237-PBS | ActB-Luciferase (firefly) (Puro), in vivo ready | 200ul, ~5 x 10 ⁷ IFU/mL in PBS |



2. Renilla Luciferase Lentivirus:

| Cat# | Product Name | Amounts |
|----------------------------|---|---|
| LVP367 | CMV-Luciferase (Renilla) (RFP-Bsd) | 200ul, ~1 x 10 ⁷ IFU/mL in DMEM containing 10% FBS |
| LVP367-PBS | CMV-Luciferase (Renilla) (RFP-Bsd), in vivo ready | 200ul, ~5 x 10 ⁷ IFU/mL in PBS |
| LVP368 | CMV-Luciferase (Renilla) (GFP-Bsd) | 200ul, ~1 x 10 ⁷ IFU/mL in DMEM containing 10% FBS |
| LVP368-PBS | CMV-Luciferase (Renilla) (GFP-Bsd), in vivo ready | 200ul, ~5 x 10 ⁷ IFU/mL in PBS |
| LVP369 | CMV-Luciferase (Renilla) (RFP-Puro) | 200ul, ~1 x 10 ⁷ IFU/mL in DMEM containing 10% FBS |
| LVP369-PBS | CMV-Luciferase (Renilla) (RFP-Puro), in vivo ready | 200ul, ~5 x 10 ⁷ IFU/mL in PBS |
| LVP706 | CMV-Luciferase (Renilla), (GFP-Puro) | 200ul, ~1 x 10 ⁷ IFU/mL in DMEM containing 10% FBS |
| LVP706-PBS | CMV-Luciferase (Renilla), (GFP-Puro), in vivo ready | 200ul, ~5 x 10 ⁷ IFU/mL in PBS |
| LVP370 | CMV-Luciferase (Renilla) (Neo) | 200ul, ~1 x 10 ⁷ IFU/mL in DMEM containing 10% FBS |
| LVP370-PBS | CMV-Luciferase (Renilla) (Neo), in vivo ready | 200ul, ~5 x 10 ⁷ IFU/mL in PBS |
| LVP371 | CMV-Luciferase (Renilla) (Puro) | 200ul, ~1 x 10 ⁷ IFU/mL in DMEM containing 10% FBS |
| LVP371-PBS | CMV-Luciferase (Renilla) (Puro), in vivo ready | 200ul, ~5 x 10 ⁸ IFU/mL in PBS |
| LVP372 | CMV-Luciferase (Renilla) (Bsd) | 200ul, ~1 x 10 ⁷ IFU/mL in DMEM containing 10% FBS |
| LVP372-PBS | CMV-Luciferase (Renilla) (Bsd), in vivo ready | 200ul, ~5 x 10 ⁷ IFU/mL in PBS |
| LVP769 | EF1a-Luciferase (Renilla), (Bsd) | 200ul, ~1 x 10 ⁷ IFU/mL in DMEM containing 10% FBS |
| LVP769-PBS | EF1a-Luciferase (Renilla), (Bsd), in vivo ready | 200ul, ~5 x 10 ⁷ IFU/mL in PBS |
| LVP770 | EF1a-Luciferase (Renilla), (Puro) | 200ul, ~1 x 10 ⁷ IFU/mL in DMEM containing 10% FBS |
| LVP770-PBS | EF1a-Luciferase (Renilla), (Puro), in vivo ready | 200ul, ~5 x 10 ⁷ IFU/mL in PBS |
| LVP771 | EF1a-Luciferase (Renilla), (Neo) | 200ul, ~1 x 10 ⁷ IFU/mL in DMEM containing 10% FBS |



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| LVP771-PBS | EF1a-Luciferase (Renilla), (Neo), in vivo ready | 200ul, ~5 x 10 ⁷ IFU/mL in PBS |
| LVP703 | CAG-Luciferase (Renilla) (Puro) | 200ul, ~1 x 10 ⁷ IFU/mL in DMEM containing 10% FBS |
| LVP703-PBS | CAG-Luciferase (Renilla) (Puro), in vivo ready | 200ul, ~5 x 10 ⁷ IFU/mL in PBS |
| LVP704 | CAG-Luciferase (Renilla) (Neo) | 200ul, ~1 x 10 ⁷ IFU/mL in DMEM containing 10% FBS |
| LVP704-PBS | CAG-Luciferase (Renilla) (Neo), in vivo ready | 200ul, ~5 x 10 ⁷ IFU/mL in PBS |
| LVP705 | CAG-Luciferase (Renilla) (RFP-Bsd) | 200ul, ~1 x 10 ⁷ IFU/mL in DMEM containing 10% FBS |
| LVP705-PBS | CAG-Luciferase (Renilla) (RFP-Bsd), in vivo ready | 200ul, ~5 x 10 ⁷ IFU/mL in PBS |

3. Cypridina Luciferase Lentivirus

| Cat# | Product Name | Amounts |
|----------------------------|--|---|
| LVP373 | Luciferase (Cypridina) (RFP-Bsd) | 200ul, ~1 x 10 ⁷ IFU/mL in DMEM containing 10% FBS |
| LVP373-PBS | Luciferase (Cypridina) (RFP-Bsd), in vivo ready | 200ul, ~5 x 10 ⁷ IFU/mL in PBS |
| LVP374 | Luciferase (Cypridina) (GFP-Bsd) | 200ul, ~1 x 10 ⁷ IFU/mL in DMEM containing 10% FBS |
| LVP374-PBS | Luciferase (Cypridina) (GFP-Bsd), in vivo ready | 200ul, ~5 x 10 ⁷ IFU/mL in PBS |
| LVP375 | Luciferase (Cypridina) (RFP-Puro) | 200ul, ~1 x 10 ⁷ IFU/mL in DMEM containing 10% FBS |
| LVP375-PBS | Luciferase (Cypridina) (RFP-Puro), in vivo ready | 200ul, ~5 x 10 ⁷ IFU/mL in PBS |
| LVP376 | Luciferase (Cypridina) (Neo) | 200ul, ~1 x 10 ⁷ IFU/mL in DMEM containing 10% FBS |
| LVP376-PBS | Luciferase (Cypridina) (Neo), in vivo ready | 200ul, ~5 x 10 ⁷ IFU/mL in PBS |
| LVP377 | Luciferase (Cypridina) (Puro) | 200ul, ~1 x 10 ⁷ IFU/mL in DMEM containing 10% FBS |
| LVP377-PBS | Luciferase (Cypridina) (Puro), in vivo ready | 200ul, ~5 x 10 ⁸ IFU/mL in PBS |
| LVP378 | Luciferase (Cypridina) (Bsd) | 200ul, ~1 x 10 ⁷ IFU/mL in DMEM containing 10% FBS |
| LVP378-PBS | Luciferase (Cypridina) (Bsd), in vivo ready | 200ul, ~5 x 10 ⁷ IFU/mL in PBS |



4. Red-Luciferase (*Luciola Italica*) Lentivirus

| Cat# | Product Name | Amounts |
|-----------------------------|--|---|
| LVP475 | EF1a-(Red-Luciferase) Lentivirus (Puromycin) | 200ul, $\sim 1 \times 10^7$ IFU/mL in DMEM containing 10% FBS |
| LVP475-PBS | EF1a-(Red-Luciferase) Lentivirus (Puromycin), in vivo ready | 200ul, $\sim 5 \times 10^7$ IFU/mL in PBS |
| LVP1232 | EF1a-(Red-Luciferase) Lentivirus (Blasticidin) | 200ul, $\sim 1 \times 10^7$ IFU/mL in DMEM containing 10% FBS |
| LVP1232-PBS | EF1a-(Red-Luciferase) Lentivirus (Blasticidin), in vivo ready | 200ul, $\sim 5 \times 10^7$ IFU/mL in PBS |
| LVP1234 | EF1a-(Red-Luciferase) Lentivirus (Neomycin) | 200ul, $\sim 1 \times 10^7$ IFU/mL in DMEM containing 10% FBS |
| LVP1234-PBS | EF1a-(Red-Luciferase) Lentivirus (Neomycin), in vivo ready | 200ul, $\sim 5 \times 10^7$ IFU/mL in PBS |
| LVP1304 | EF1a-(Red-Luciferase) Lentivirus (Zeocin) | 200ul, $\sim 1 \times 10^7$ IFU/mL in DMEM containing 10% FBS |
| LVP1304-PBS | EF1a-(Red-Luciferase) Lentivirus (Zeocin), in vivo ready | 200ul, $\sim 5 \times 10^7$ IFU/mL in PBS |
| LVP1305 | EF1a-(Red-Luciferase) Lentivirus (Hygromycin) | 200ul, $\sim 1 \times 10^7$ IFU/mL in DMEM containing 10% FBS |
| LVP1305-PBS | EF1a-(Red-Luciferase) Lentivirus (Hygromycin), in vivo ready | 200ul, $\sim 5 \times 10^8$ IFU/mL in PBS |

Storage: stored at $-80\text{ }^{\circ}\text{C}$, avoid freeze/thaw cycles. Stable for >6 months.

Product Description:

Lentiviral system is a gene delivery tool using lentivectors for gene expression or knockdown. GenTarget's lentivector system is Human Immunodeficiency Virus-1 (HIV) based plasmids for gene expression and knockdown. The lentivectors are used to generate lentiviral particles (lentivirus) that can be transduced into almost all kinds of mammalian cells, including stem cells, primary cells, and non-dividing cells both *in vivo* and *in vitro*. Lentiviral Particles stably integrate into the transduced cells' genome for long term expression, making it a great gene transfer agent.

Luciferases are widely used in reporter assays for monitoring cellular events associated with gene expression. Firefly luciferase (**F-luc**) and Renilla luciferase (**R-Luc**) are used for end point analysis with different emission wavelength using different substrates, which commonly used for dual reporter assays. Cypridina



Luciferase (**C-Luc**) is a secreted luciferase, providing the measurement in real-time and in time-course manner from cell culture supernatant. **Red-Luciferase** is the red-shifted *Luciola italica* luciferase for in vivo bioluminescence imaging.

Compare different luciferases:

Firefly Luciferase (F-Luc) is the most common used bioluminescence Reporter. The reaction has high sensitivity, low background and easy adaptation for high-throughput screening for both in vitro and in vivo assays.

Renilla Luciferase (R-Luc) a 36kDa monomeric enzyme, having many of the same properties as firefly luciferase (FLuc), and used for living cells assays. However, R-Luc catalyzes different substrate than firefly luciferase. R-Luc catalyzes the oxidation of coelenterazine to yield blue light of 480nm and does not require ATP for the reaction, whereas F-Luc catalyzes the oxidation of luciferin to yield longer wavelength light at 562nm.

Cypridina lucifase is significantly brighter than firefly luciferase (10-20 folder brighter), emitting blue light (Em peaked at 462nm).

Red-Luciferase has the prolonged light activity than North American firefly luciferase, showing brighter for deeper tissue penetration in vivo after injection of D-luciferin. Light emission peaked at 10 minutes post-D-luciferin injection and retained 60% of signal at 1 hour.

Different luciferases can be used together for multiple reporter assays in single solution.

| Types | Substrate | Wavelength Peak | Secreted | Sensitivity | Require ATP | Measurement |
|---|----------------|-----------------|----------|-------------|-------------|---|
| F-luc (Firefly Luciferase) | D-Luciferin | 562 nm | No | medium | Yes | Peaked at 2 seconds, last for ~10 seconds |
| G-luc (Gaussia Luciferase) | coelenterazine | 480 nm | Yes | extreme | No | Measure luc activity from supernatant for living cells. Luc activity is stable at low pH; measure within 30 seconds |



| | | | | | | |
|---|------------------------|--------|-----|---------|-----|---|
| C-Luc (Cypridina Luciferase) | cypridina luciferin | 465 nm | Yes | extreme | No | Measure luc activity from supernatant for living cells. Luc activity is inhibited by EDTA; Long half-life at ~ 48 hours. |
| R-Luc (Renilla Luciferase) | coelenterazine | 480 nm | No | medium | No | Peaked at 2 seconds, last for 10 second |
| Red-Luc (Luciola italica Luciferase) | D-Luciferin | 614 nm | No | medium | Yes | Peaked at 10 min, last 1 hour |

Premade luciferase expression lentivirus:

GenTarget provides pre-made lentiviral particles, expressing all kinds of Luciferases (**including firefly-luc, Red-Luc, Renilla and Cypridina Luciferase**), with different fluorescent and or antibiotic selection. Each luciferase coding sequence was fully human codon optimized for higher expression in mammalian cells. The lentivirus was pseudotyped with VSVG envelope protein, produced in 293T cells. All particles were tested to be free bacterial and mycoplasma contamination. Virus titers were tested lot by lot.

Ready-to-use luciferase lentiviral particles are provided in two formats:

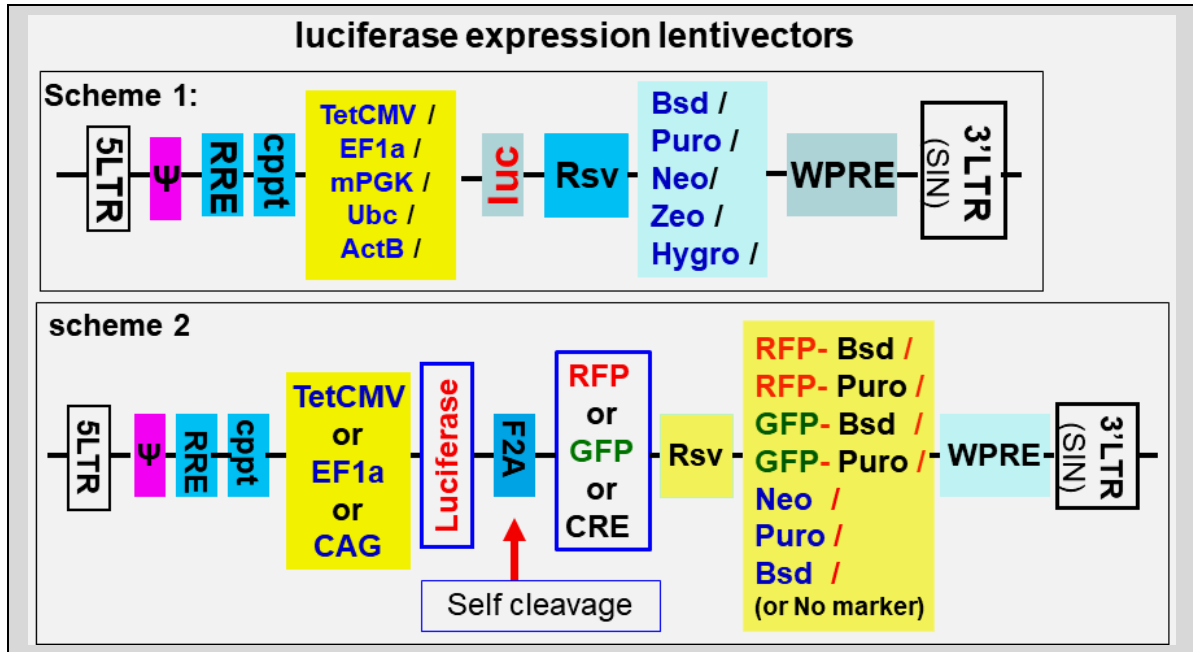
1. Packaged in 10% of FBS in DMEM containing 10% FBS and 60ug/ml of polybrene (10x);
2. Particles were concentrated and buffer exchanged in PBS without any human or animal origin components. The virus in PBS solution is good for any cell types that requires non-serum in the application.

For more details about premade particles, please see [FAQ for pre-made lentiviral particles](#) (.pdf).

Luciferase expression lentivector structure:



1. High expression lentivectors under different promoters and contains different markers:



For best expression in different cell types, the luciferase was expressed under different promoters, including, 1) a super strong, our proprietary optional inducible CMV promoter (TetCMV), 2) a re-engineered strong EF1a promoter, 3) CAG promoter, 4) mPGK promoter, 5) Ubc promoter, or 6) Actin beta promoter (ActB).

The **TetCMV** promoter provides superior expression levels, and can be optionally used as tetracycline inducible expression when desired (see more details at: [Optional inducible expression link](#)). The engineered **EF1a** promoter is non-tissue specific, highly expressed in all cell types, and less likely be silenced after long-term culture. The **CAG** promoter is a combination of the cytomegalovirus (CMV) early enhancer element and chicken beta-actin promoter. The research showed CAG promoter is more tissue specific promoter, and very active in some types of cells like Embryonic stem cells (ES cells).

An antibiotic selection marker (Blasticidin, Puromycin, Neomycin, Zeocin, or Hygromycin) or a Fluorescent-Antibiotic fusion dual marker, is expressed under Rsv promoter. (see vector core structure scheme above).



Some constructs (Scheme 2 above), a fluorescent marker (**GFP** or **RFP**) was bicistronically expressed under the same promoter as that for luciferase, mediated by a F2A element (Note: fluorescent protein and luciferase are expressed as individual protein, not as fusion). And under a separated RSV promoter, an antibiotic marker (Blasticidin, Puromycin or Neomycin), or a fluorescent-antibiotic fusion dual marker (GFP-blasticidin, GFP-puromycin, RFP-blasticidin or RFP-puromycin) was express.

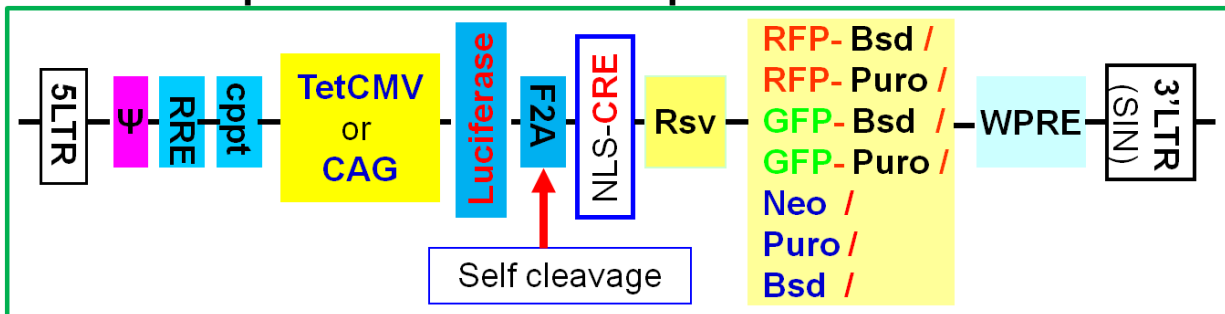
Some products do not contain any antibiotic selection marker (**CAT#:** [LVP911a](#), [LVP911b](#))

The luciferase expression lentivirus are good indicators for monitoring both promoter's activities in your specific cell lines, and for in vivo imaging via light emission via luciferase substrate.

2. Luciferase and CRE recombinase double expression:

For Luciferase and CRE recombinase double expression lentivirus, Luciferase and CRE was bicistronically expressed under the same promoter, and the fluorescent and antibiotic **dual fusion marker** was expressed under RSV promoter. See vector scheme 3 below.

Luciferase expression lentivector map scheme 4:



Key features:

1. High luciferase expression level and high viral titers with different promoter selection for different cell types;
2. Used as constitutive expression, or optionally as tetracycline inducible expression (for CMV promoter only);
3. Easy transduction monitoring via the fluorescent signal (not for all particles);
4. Dual markers and wide antibiotic marker selection: transduced cells can be sorted via a fluorescent signal or selected via antibiotics;
5. **The lentivirus are ready-to-use and easy to use, simply add 50ul into one well of your cell culture in 24-well plate. The luciferase**



expression peaks at 3 days post virus transduction. (Note: dependent upon your specific needs, you may design the transduction with different MOI for different levels of expression.)

Transduction Protocols:

1) Transduction Protocol for Adhesive cells :

Note: Pre-made lentivirus is provided ready to use, so it can be simply added into your cell culture; the amount of virus to add depends on cell type. For quick transduction, add 50 μ l of virus into each well of 24-well-plate where cell density is 50% to 75%. After 72 hours (no need to change medium), visualize positive transduction rate by fluorescence microscopy. For stable cell line generation, pass cells into medium containing antibiotic or perform fluorescence cell sorting followed by antibiotic selection.

Day 0:

Seed cells in complete medium at the appropriate density and incubate overnight.

Note: at the time of transduction, cells should be 50%-75% confluent. For example, seed HeLa cells at $0.5 \times 10^5/\text{ml} \times 0.5\text{ml}$ in a well of a 24-well plate.

Day 1:

- Remove the culture medium and add 0.5ml fresh, warm, complete medium.
- Thaw the pre-made lentiviral stock at room temperature and add the appropriate amount of virus stock to obtain the desired MOI.
- Return cells to 37°C, CO₂ incubator.

Note: Try to avoid freezing and thawing. If you do not use all of the virus at one time, you may re-freeze the virus at -80 °C for future use; virus titer will decrease by ~10% for each freeze/thaw cycle.

Day 3:

At ~72hr after transduction, check the transduction rate by fluorescence microscopy or calculate the exact transduction rate by flow cytometry (FACS or Guava).

Day 3 + (optional):

Sort transduced cells by FACS, and select for antibiotic resistance. A pilot experiment should be done to determine the antibiotic's kill curve for your specific cell line (refer to the pertinent literature on generation of stable cell lines).



2) Transduction Protocol for Suspension Cells:

Grow cells in complete suspension culture medium; use a shaking flask in a CO² incubator if necessary.

Measure cell density. When density has reached $\sim 3 \times 10^6$ cells/ml, measured viability should be > 90%. Dilute cells into 1×10^6 cell/ml in complete medium.

Day 1:

- Thaw lentiviral particles at room temperature.
- Add premade lentiviral particles into the diluted cells at a ratio of: 50 to 100 μ l virus per 0.5 ml of cells (Note: depending on cell type, you may need to use more or less virus).
- Grow cells in a shaking flask in a CO₂ incubator.

Day 2:

At 24 hours after transduction, add an equal amount of fresh medium containing relevant antibiotics. **Note:** amount of antibiotic depends on cell type. Continue growing cells in CO₂ incubator.

Day 3:

At 72 hours after transduction, check fluorescence with a fluorescence microscope or calculate the transduction efficiency using a cell sorter such as FACS or Guava. Sort for fluorescence positive cells and maintain antibiotic selection to generate a stable cell line.

Safety Precaution:

GenTarget lentiviral particles adapt must advanced lentiviral safety features (using the third generation vectors with self-inactivation SIN-3UTR), and the premade lentivirus is replication incompetent. However, please use extra caution when using lentiviral particles. Use the lentiviral particles in Bio-safety II cabinet. Wear glove all the time at handling Lentiviral particles! Please refer CDC and NIH's guidelines for more details regarding to safety issues.

References:

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10. NIH Guidelines for [Biosafety Considerations for Research with Lentiviral Vectors](#). (Link).



11. [CDC guidelines for Lab Biosafety levels \(Link\).](#)

Warranty:

This product is for research use only. It is warranted to meet its quality as described when used in accordance with its instructions. GenTarget disclaims any implied warranty of this product for particular application. In no event shall GenTarget be liable for any incidental or consequential damages in connection with the products. GenTarget's sole remedy for breach of this warranty should be, at GenTarget's option, to replace the products.

Note: Filter wavelength settings:

BFP filter: ~Ex380 ~Em460; **CFP filter:** ~Ex436 ~Em480;
GFP filter: ~Ex450-490 ~Em525; **YFP filter:** ~Ex500 ~Em535;
RFP filter: ~Ex545 ~Em620;

Related Products: GenTarget's pre-made lentivirus product category.

| Product Category | Product Description (please click category name to see product's pages) |
|---|---|
| Human, mouse or rat ORFs | Premade lentivirus expressin a human, mouse or rat gene with RFP-Blastididin fusion dual markers. |
| Fluorescent markers | Preamde lentivirus express human codon optimized fluoescent protein, GFP / RFP / CFP / BFP / YFP . |
| Luciferase expression | Premade lentivirus for all kinds of luciferase protein expression: firefly and Renilla with different antibiotic selection markers. |
| CRE recombinase | Premade lentivirus for expressing nuclear permeant CRE recombinase with different flurescent and antibiotic markers. |
| LoxP ColorSwitch | Premade lentivirus expressing "LoxP-GFP-Stop-LoxP-RFP" cassette, used to monitor the CRE recombination event in vivo. |
| CRISPR /hu CAS9 | Preamde lentivirus express humanized wild-type Cas9 endonuclease for genomic editing with CRISPR |
| TetR inducible expression repressor | Premade lentivirus expressin TetR (tetracycline regulator) protein, the repressor protein for the inducible expression system. |
| iPS factors | Premde lentivirus for human and mouse iPS (Myc, NANOG, OCT4, SOX2, FLF4) factors with different fluorescent and antibitoic markers |
| T-antigen Expression | Express SV40 large T antigen with different selection markers |
| Cell | Premade lentivirus for cell organelle imaging. The fluorescent |



| | |
|---|--|
| Organelle imaging | marker GFP/RFP/CFP was sub-cellular localized in different cell organelle for living cell imaging. |
| LacZ expression | Express different full length β-galactosidase (lacZ) with different selection markers |
| Anti-miRNA lentivirus | Pre-made lentivirus expression a specific anti-miRNA cassette. |
| Fluorescent-ORF fusion | Pre-made lentivirus expression a " GFP/RFP/CFP-ORF " fusion target. |
| Pre-made shRNA lentivirus | Premade shRNA lentivirus for knockdown a specific genes (P53, LacZ, Luciferase and more). |
| microRNA and anti-microRNA lentivirus | Premade lentivirus expression human or mouse precursor miRNA . And anti-miRNA lentivector and virus for human and mouse miRNA. |
| Negative control lentiviruses | Premade negative control lentivirus with different markers : serves as the negative control of lentiviruses treatment, for validation of the specificity of any lentivirus target expression effects. |
| Other Enzyme | Ready-to-use lentivirus, expressing specific enzymes with different selection markers. |