**Supplementary File 1. Table with Summary of injections performed in dogs and primates**. AAV selection rounds in canines 2b and 5b were repeated selections of the previous rounds, which did not result in the amplification of AAV variants.

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| **Round of DE selection** | **Species/ ID/****Gender** | **DOB** | **Age at injection** | **Virus injected** | **Amount virus injected/eye** | **Notes** |
| 1 | CanineI-430(F) | 9/16/11 | 11 months | Prepacked Shuffle, AAV2-7mer, EP2 and Loopswap libraries | ~4E+13 vg total, 1E+13 vg each library | No adverse events |
| 2a | CanineI-429(F) | 9/16/11 | 14 months | Recovered variants from round 1 | ~1E+13 vg | No variants recovered; no immune response noted |
| 2b | CanineI-428(M) | 8/20/11 | 17 months | Recovered variants from round 1 (repeated) | ~1.6E+12 vg | No adverse events (Repeat of previous round) |
| 3 | CanineCDJCCL(F) | 10/5/12 | 12 months | Recovered variants from round 2 | ~6.7E+12 vg | OS uveitis |
| 4 | CanineCEDCZF(F) | 4/26/13 | 7 months | Recovered EP PCR variants from round 3, SCHEMA library | ~2.54E+12 vg | Error prone PCR conducted, No adverse events |
| 5a | CanineCEDCVS(F) | 4/21/13 | 9 months | Recovered variants from round 4 | ~5E+12 vg | Uveitis, no detachment, retina grossly normal, no variants recovered |
| 5b | CanineCEJCJY(F) | 10/11/13 | 13 months | Recovered variants from round 4 (repeated) | ~3E+12 vg | No adverse events (Repeat of previous round) |
| GFP-barcode | CanineCGBCAN(M) | 2/1/15 | 8 months | GFP-barcode library | 6E+11 vg each of 7 variants in 250 uL | No adverse events |
| GFP-barcode | CanineCGBCDI(M) | 2/5/15 | 8 months | GFP-barcode library | 6E+11 vg each of 7 variants in 250 uL | No adverse events |
| GFP-barcode | CanineCGBCGS(M) | 2/7/15 | 8 months | GFP-barcode library | 6E+11 vg each of 7 variants in 250 uL | No adverse events |
|  | MarmosetM9-17(F) | 07/01/2012 | 7 years | OD: GFP-barcoded AAV libraryOS: GFP-barcoded AAV library | ~1.24E+11 vg in 25 µL | No adverse eventsAAV2 Nab titer prior to injection = 1:2 |
|  | MarmosetM23-17(F) | 02/09/2014 | 3 years | OS: GFP-barcoded AAV library | ~1.24E +11 vg in 25 µL | No adverse eventsAAV2 Nab titer prior to injection = 1:2 |
|  | CynomolgusMacaque262-19(F) | ~2016 (Exact D.O.B. unknown) | ~3 years | OD: GFP-barcoded AAV library OS:   GFP-barcoded AAV library | ~6.46E+11 vg in 130 µL | OD and OS uveitisAAV2 Nab titer prior to injection = 1:2 |
|  | CynomolgusMacaqueM79-19(F) | ~2016 (Exact D.O.B. unknown) | ~3 years | OD: K912-scCAG-GFP | ~2.6E+12 vg in 120 µL | No adverse eventsAAV2 Nab titer prior to injection = 1:2 |
|  | Rhesus macaqueM273-18(M) | 8/20/15 | 4 years | OD: K912-saCas9-guideRNA +K912-scCAG-GFP | ~1.4E+12 vg in 130 ul, +~3.3E+11 vg in 15 ul, +20 ul PBS | No adverse eventsAAV2 Nab titer prior to injection = 1:2 |
|  | CynomolgusMacaqueM80-19 (F) |  ~2016 (Exact D.O.B. unknown) | ~3 years  | OS: K912-saCas9-guideRNA | ~1.2E+12 vg in 100 µl | No adverse eventsAAV2 Nab titer prior to injection = 1:2 |