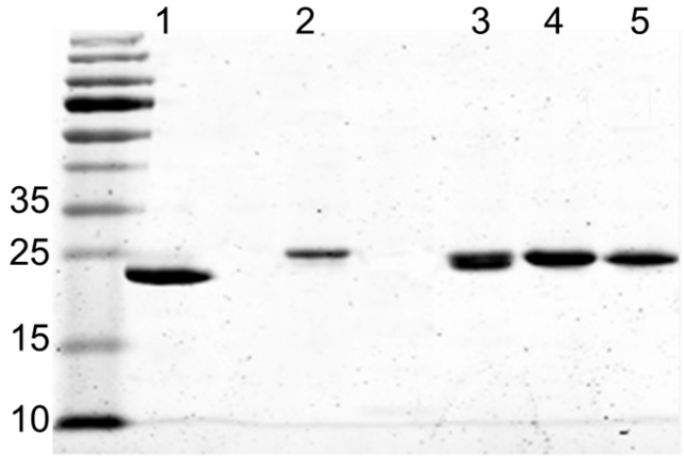
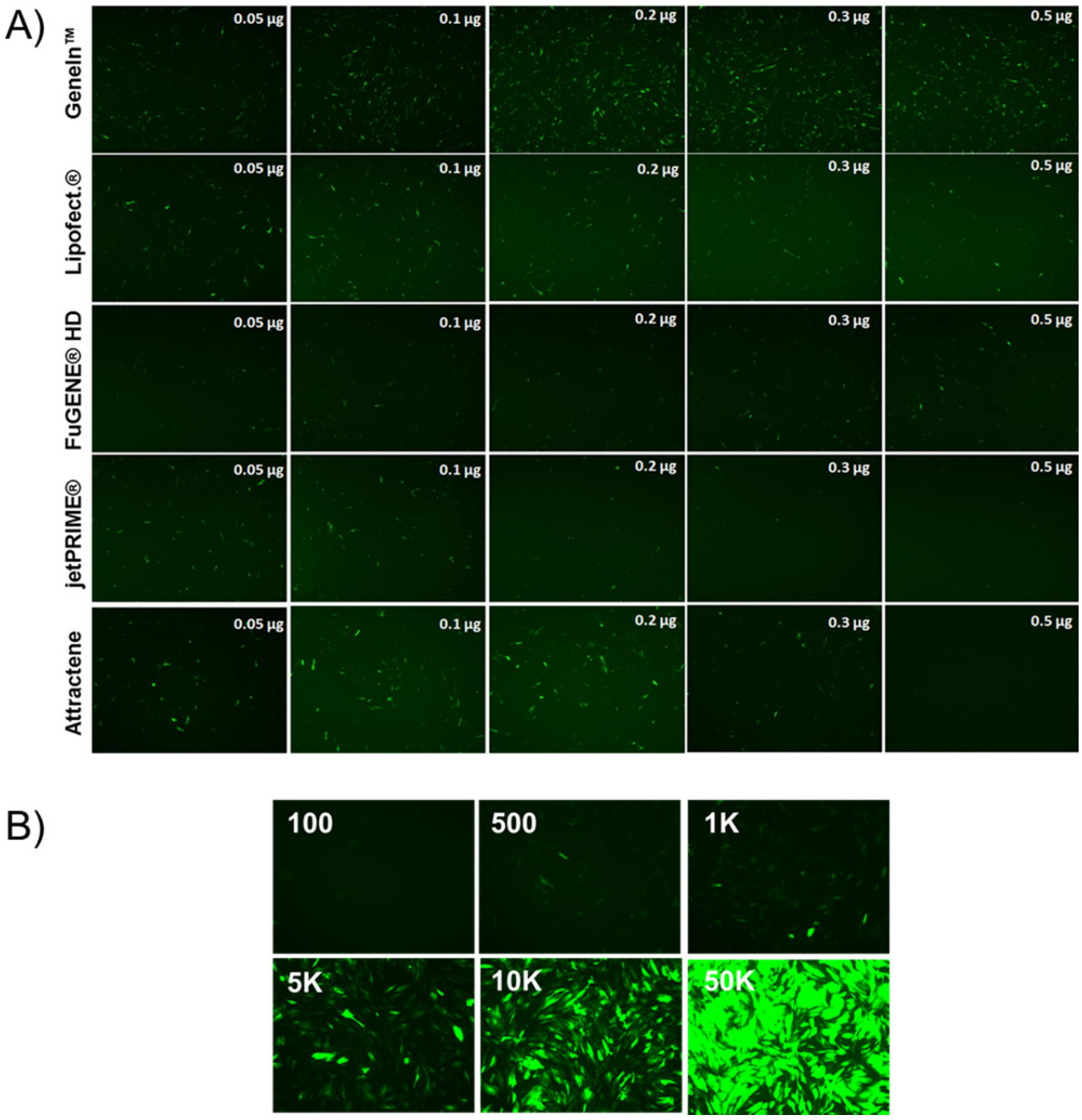
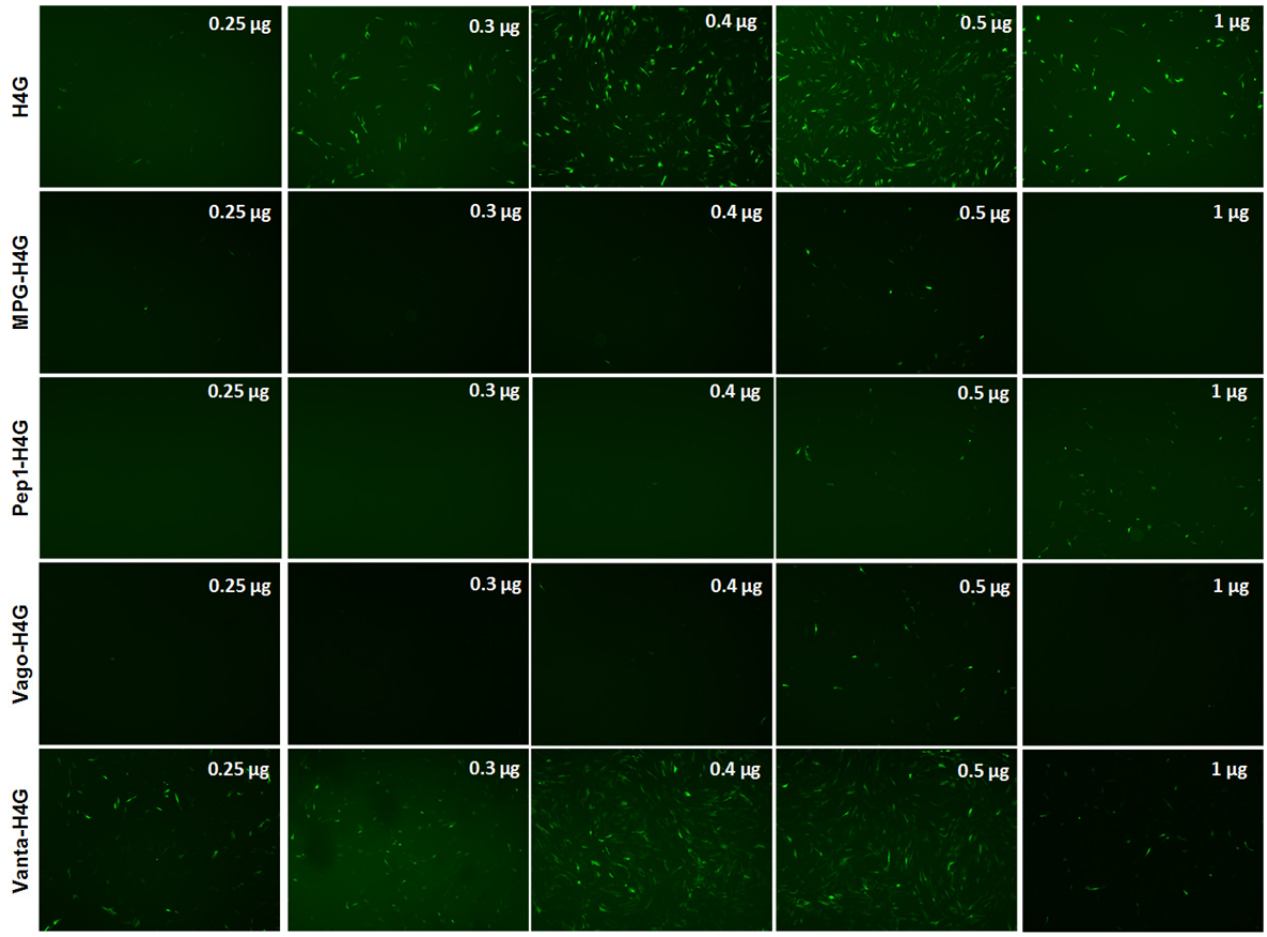
Supplementary Materials



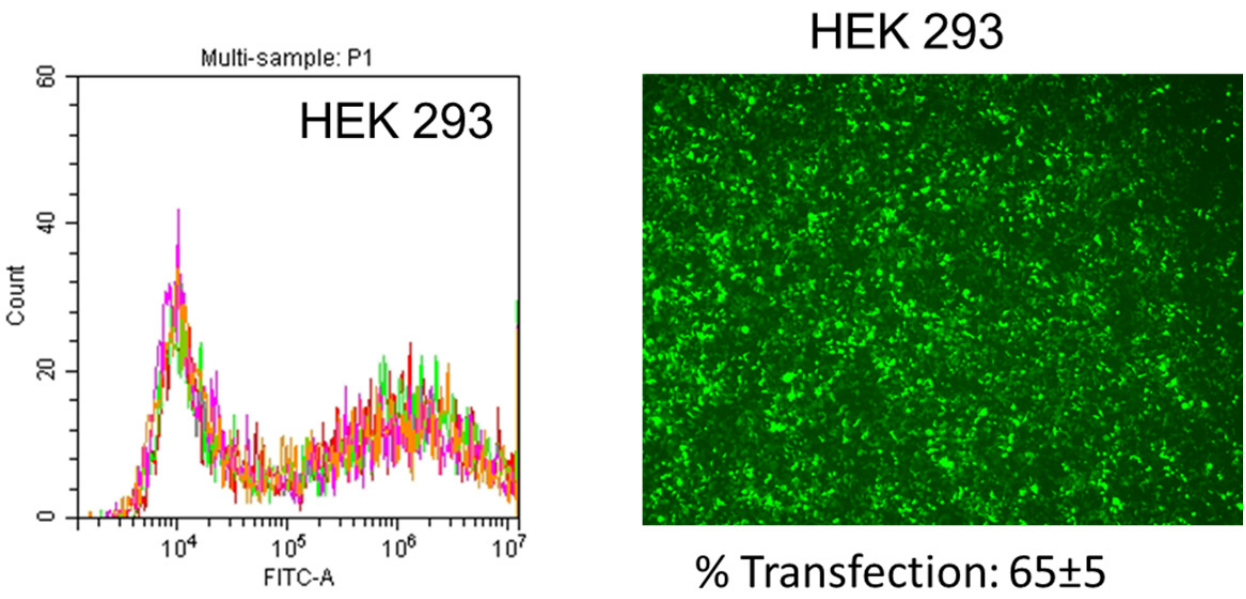
Supporting Figure 1: SDS-PAGE analysis of the purified designer biomimetic vectors. Lanes 1 to 5: H4G (19.75 kDa), Pep1-H4G (22.58 kDa), MPG-H4G (22.54 kDa), V_{ago}-H4G (22.33 kDa), V_{anta}-H4G (22.45 kDa), respectively.



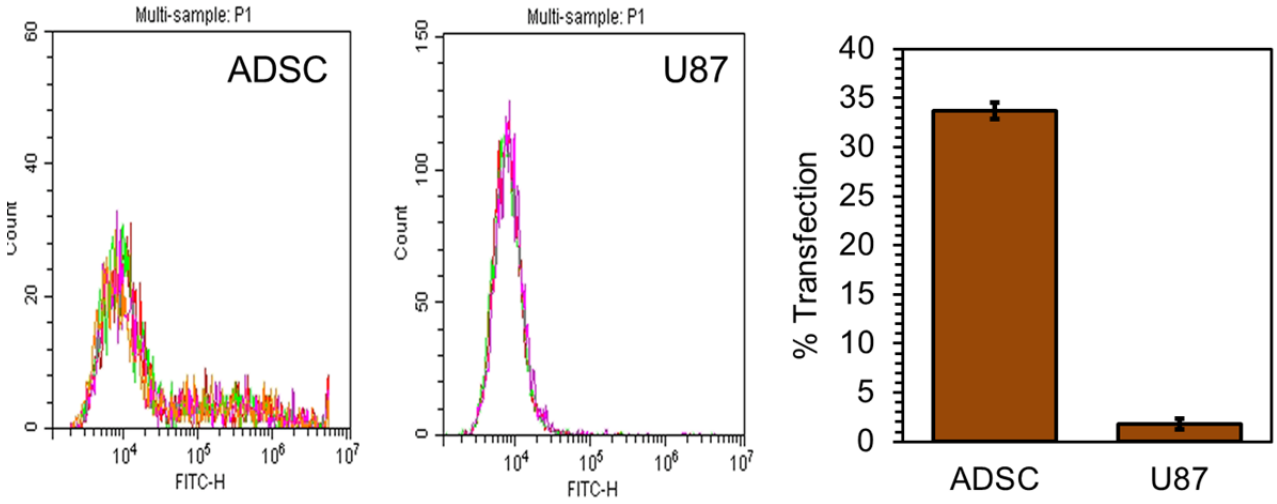
Supporting Figure 2: The fluorescent microscopy images of the transfected cells with commercial vectors. A) Transfected ADSCs by commercial non-viral vectors using different amounts of pEGFP. B) Transfected ADSCs by Ad-GFP at different MOIs ranging from 100 to 50,000.



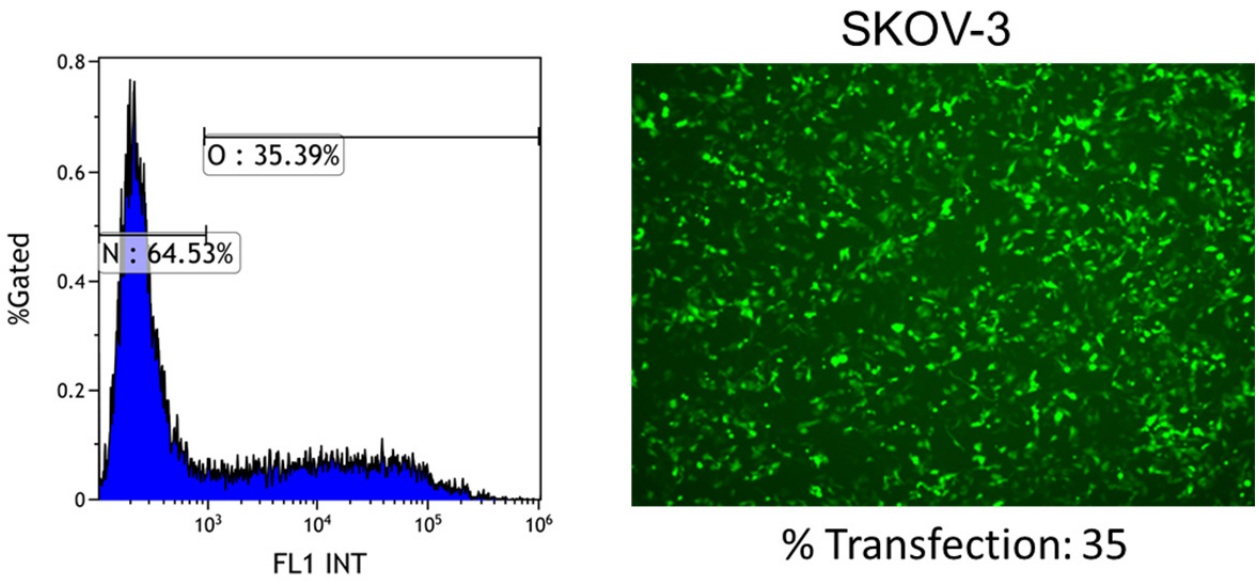
Supporting Figure 3: The fluorescent microscopy images of the transfected cells with DBVs using different amounts of pEGFP.



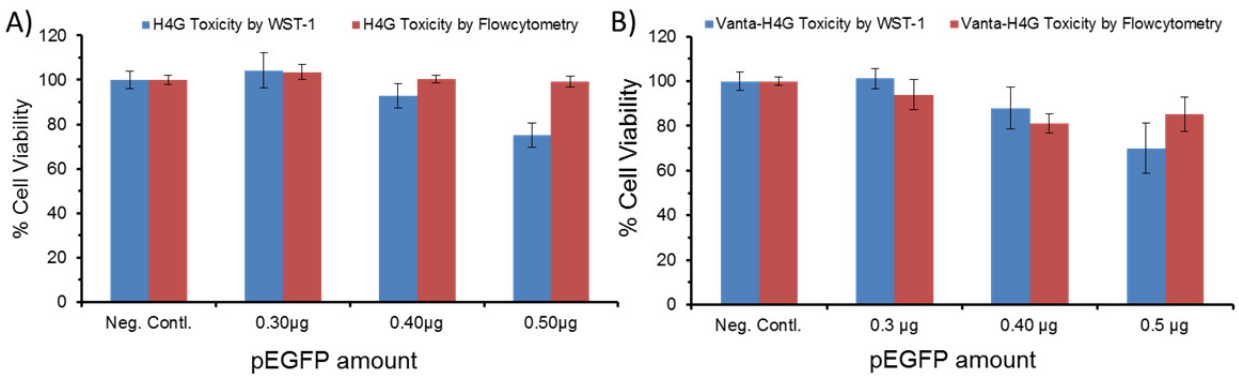
Supporting Figure 4: Flow cytometry histogram (left panel) and fluorescent microscope image (right panel) of HEK293 cells transfected with H4G/pEGFP nanocomplexes. The percentage of transfected cells is determined by flow cytometry (mean±s.d., n=3).



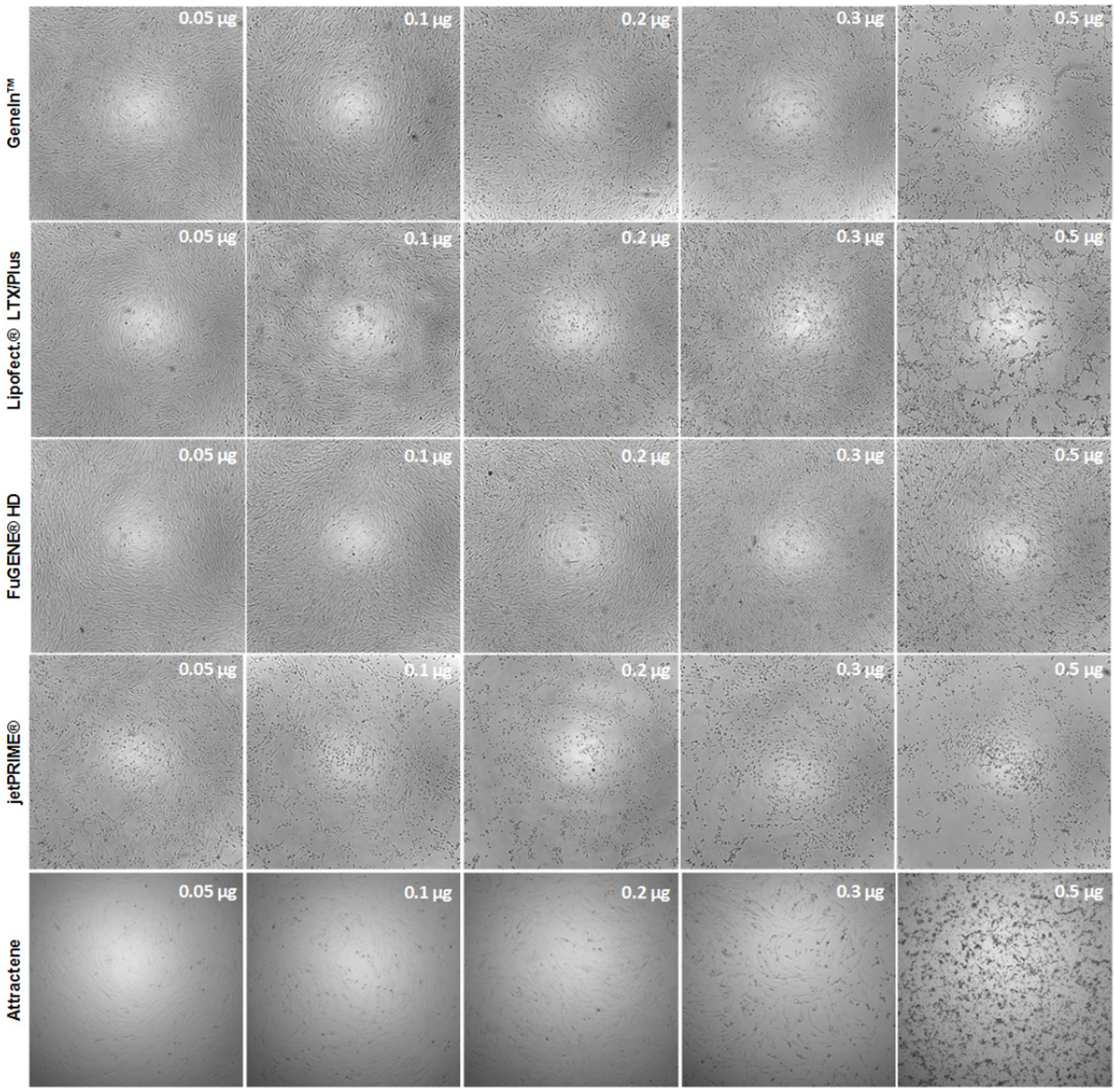
Supporting Figure 5: ADSC (VEGFR-1 positive) and U87 (VEGFR-1 negative) cells transfected with V_{anta}-H4G. Left panel) Flowcytometry histogram of transfected ADSCs (n=3). Mid panel) Flowcytometry histogram of transfected U87 cells (n=3). Right panel) Bar chart showing the percentage of transfected cells in each cell line as determined by flow cytometry.



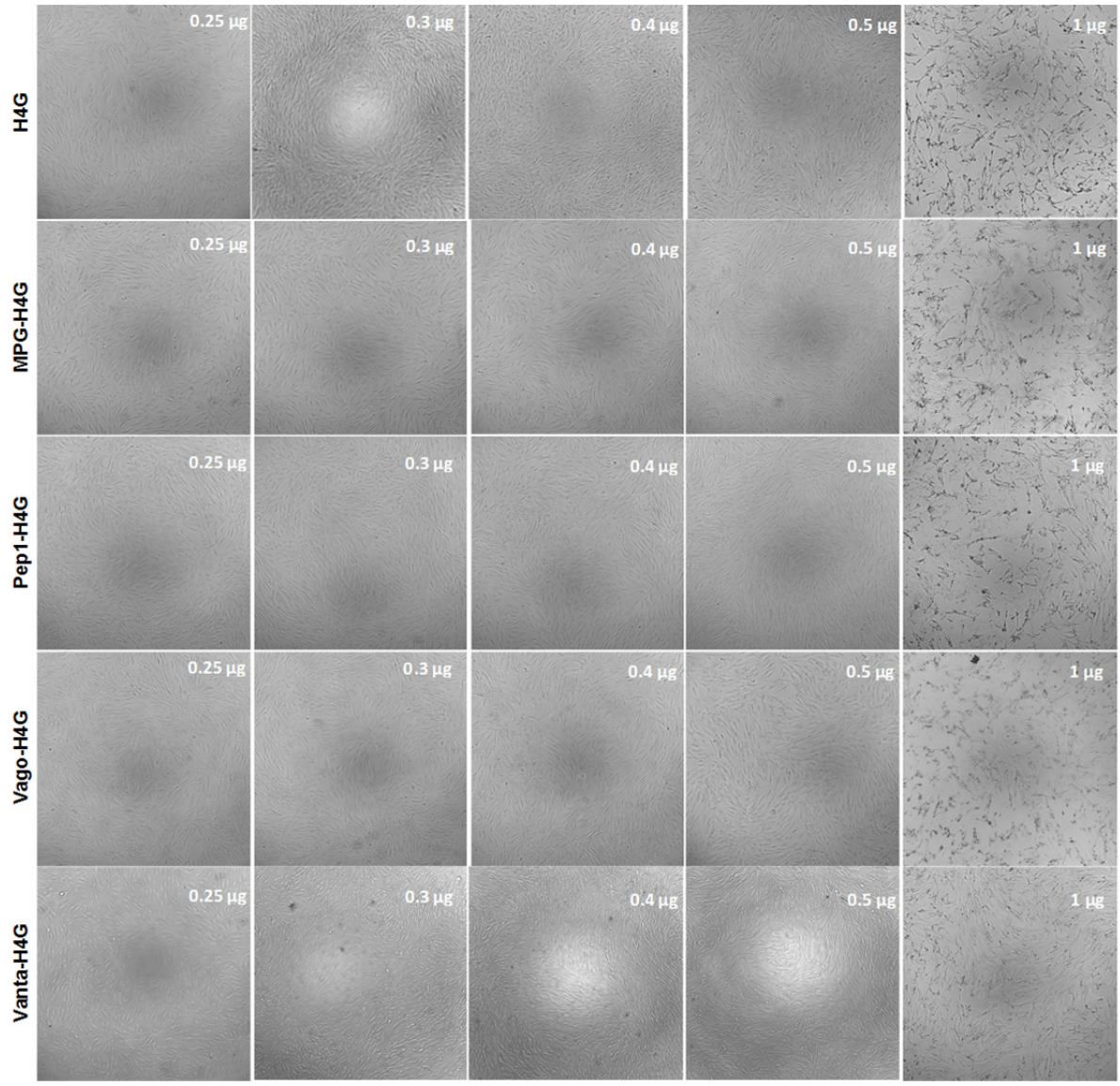
Supporting Figure 6: Flow cytometry histogram (left panel) and fluorescent microscope image (right panel) of SKOV-3 cells transfected with Pep1-H4G carrying 0.5μg of pEGFP. The percentage of transfected cells is determined by flow cytometry.



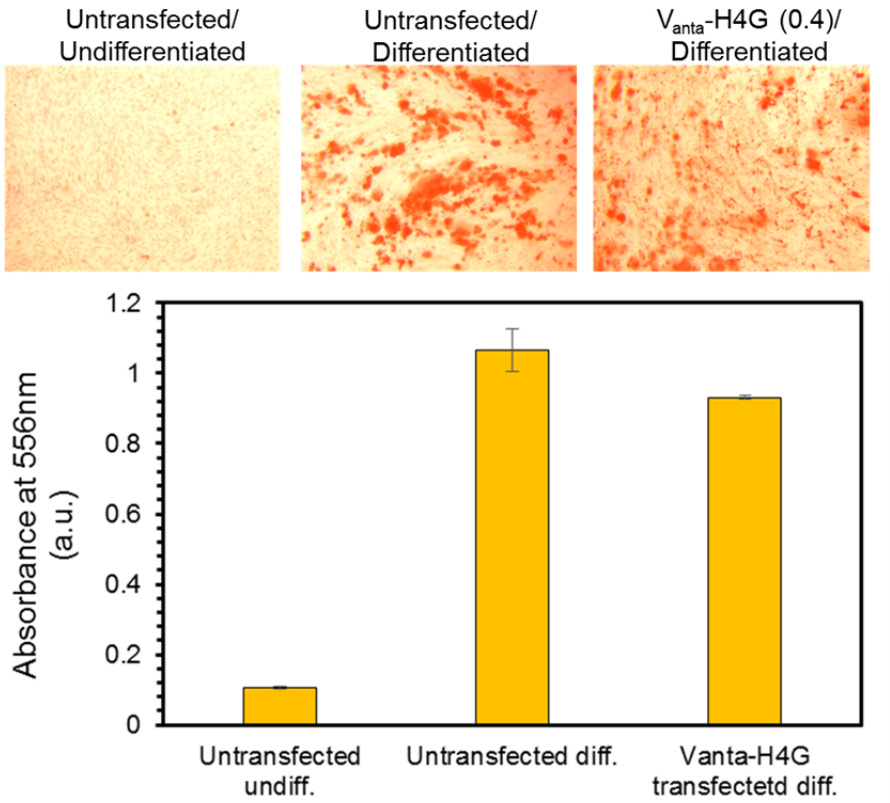
Supporting Figure 7: Evaluation of the ADSC viability after transfection by H4G (A) and Vanta-H4G (B) by flowcytometry. ADSCs were seeded in 96-well plates and transfected with vector/pEGFP complexes as described. Forty-eight hours post transfection, cells were washed with PBS and detached with Accutase solution at room temperature. Right before FACS analysis, 1 µl of Propidium Iodide solution (1 µg/ul) was added to each well, mixed gently and incubated for 1 minute in the dark. Cell viability (live/dead) was then quantified by flow cytometry.



Supporting Figure 8: The light microscopy images of the transfected cells with commercial vectors carrying different amounts of pEGFP showing different levels of toxicities.



Supporting Figure 9: The light microscopy images of the transfected cells with DBVs carrying different amounts of pEGFP showing different levels of toxicities.



Supporting Figure 10: ADSC differentiation into osteocytes. Bar chart showing the percentages of differentiated cells in each treated and untreated group

Supporting Table 1: The names and fold changes of the dysregulated genes (out of 84 tested) post transfection. The names of the genes that were not significantly dysregulated are not shown.

Gene Name	H4G (0.3µg pDNA)	H4G (0.4µg pDNA)	V_{anta}-H4G (0.4µg pDNA)	Ad-GFP (MOI: 5K)	Ad-GFP (MOI: 50K)
HGF	NS	NS	NS	-6.63 (p=0.001)	-6.74 (p=0.001)
KIT	NS	NS	+3.91 (p=0.008)	-2.54 (p=0.002)	-3.48 (p=0.0005)
KITLG	NS	NS	+2.13 (p=0.0002)	NS	NS
MYB	NS	NS	NS	NS	-2.11 (p=0.007)
CDKN2B	NS	NS	-4.13 (p=0.001)	NS	NS
FHIT	NS	NS	NS	+2.24 (p=0.04)	+2.14 (p=0.004)
S100A4	NS	+2.35 (p=0.001)	NS	+2.79 (p=0.00002)	+2.84 (p=0.0002)
SERPINB5	NS	NS	+12.38 (p=0.00005)	NS	NS
BCR	NS	NS	NS	NS	+2.11 (p=0.002)
FOS	NS	-2.21 (p=0.0002)	-2.08 (P=0.000006)	NS	NS
TNF	NS	-2.50 (P=0.03)	-4.02 (p=0.02)	NS	NS
CDKN2A	NS	NS	NS	-2.03 (p=0.00007)	-2.26 (p=0.00004)
CDH1	NS	NS	NS	NS	+2.14 (p=0.004)
BCL2	NS	NS	NS	+2.50 (p=0.04)	+2.53 (p=0.008)
Total No. of Affected Genes	0	3	6	6	9

NS: No Significant Change (less than 2 fold or $p>0.05$)

+ : up-regulated

- : down-regulated