Supplementary Materials

Table S1. Mean ranks of Study groups.

	Study Groups	N	Mean Rank
Viability	Wright et al., 2021	6	958.17
	Zhao et al., 2019	18	756.25
	Wu et al., 2019	12	828.17
	Yan et al., 2020	16	678.44
	Kundu et al., 2020	6	498.58
	Deng et al., 2021	12	134.00
	Kim et al., 2021	30	681.28
	Vejdani Noghreiyan et al., 2020	5	918.50
	Zhang et al., 2020	36	687.26
	Ali et al., 2020	6	602.42
	Wang et al., 2019	12	879.71
	Khatoon et al., 2018	5	603.80
	Maksimović-Ivanić et al., 2019	9	453.78
	Yang et al., 2019	32	403.19
	Xie et al., 2016	10	483.90
	Paris et al., 2016	10	953.75
	Guo et al., 2016	32	731.28
	Ebabe Elle et al., 2016	32	142.03
	You et al., 2016	6	334.00
	Zhang et al., 2016	8	616.13
	Mannerström et al., 2016	64	587.49
	T. Li et al., 2017	6	699.33
	Ferrauto et al., 2017	6	925.42
	Chen et al., 2016	28	700.57
	Cheng et al., 2017	20	533.63
	Fei et al., 2017	96	447.24
	Zhou et al., 2017	30	879.18

	Nguyen et al., 2017	44	417.00
	Dréau et al., 2016	14	969.68
	Kienzle et al., 2017	17	692.68
	Liu et al., 2017	29	761.76
	Chou et al., 2017	72	647.11
	Paatero et al., 2017	12	1130.75
	Y. Li et al., 2017	6	642.33
	Martínez-Carmona et al., 2018	8	280.75
	Hei et al., 2017	4	699.88
	Gounani et al., 2018	144	750.61
	Saroj and Rajput, 2018	24	734.58
	Tran et al., 2018	10	407.70
	Li et al., 2018	32	566.77
	Hou et al., 2018	6	730.00
	Braun et al., 2018	155	682.31
	Guo et al., 2018	16	650.69
	Lu et al., 2018	28	703.93
	Mohammadpour et al., 2019	64	296.77
	Total	1238	

Table S2. Post hoc test of Study Groups

Sample 1-Sample 2	Test Statistic	Std. Error	Std. Test Statistic	Adj. Sig.[a]
Deng et al., 2021-Chou et al., 2017	-513.111	111.477	-4.603	0.004
Deng et al., 2021-Kim et al., 2021	-547.283	122.117	-4.482	0.007
Deng et al., 2021-Braun et al., 2018	-548.313	107.129	-5.118	0.000
Deng et al., 2021-Zhang et al., 2020	-553.264	119.174	-4.642	0.003
Deng et al., 2021-Kienzle et al., 2017	-558.676	134.799	-4.145	0.034
Deng et al., 2021-Chen et al., 2016	-566.571	123.357	-4.593	0.004
Deng et al., 2021-Lu et al., 2018	-569.929	123.357	-4.620	0.004
Deng et al., 2021-Guo et al., 2016	-597.281	121.022	-4.935	0.001
Deng et al., 2021-Saroj and Rajput, 2018	-600.583	126.403	-4.751	0.002
Deng et al., 2021-Gounani et al., 2018	-616.615	107.422	-5.740	0.000
Deng et al., 2021-Zhao et al., 2019	622.250	133.241	4.670	0.003
Deng et al., 2021-Liu et al., 2017	-627.759	122.717	-5.115	0.000
Deng et al., 2021-Wu et al., 2019	694.167	145.958	4.756	0.002
Deng et al., 2021-Zhou et al., 2017	-745.183	122.117	-6.102	0.000
Deng et al., 2021-Wang et al., 2019	-745.708	145.958	-5.109	0.000
Deng et al., 2021-Vejdani Noghreiyan et al., 2020	-784.500	190.306	-4.122	0.037
Deng et al., 2021-Ferrauto et al., 2017	-791.417	178.761	-4.427	0.009

Deng et al., 2021-Paris et al., 2016	-819.750	153.082	-5.355	0.000
Deng et al., 2021-Wright et al., 2021	824.167	178.761	4.610	0.004
Deng et al., 2021-Dréau et al., 2016	-835.679	140.649	-5.942	0.000
Deng et al., 2021-Paatero et al., 2017	-996.750	145.958	-6.829	0.000
Ebabe Elle et al., 2016-Fei et al., 2017	-305.214	72.979	-4.182	0.029
Ebabe Elle et al., 2016-Li et al., 2018	-424.734	89.381	-4.752	0.002
Ebabe Elle et al., 2016-Mannerström et al., 2016	-445.461	77.406	-5.755	0.000
Ebabe Elle et al., 2016-Chou et al., 2017	-505.080	75.959	-6.649	0.000
Ebabe Elle et al., 2016-Guo et al., 2018	-508.656	109.468	-4.647	0.003
Ebabe Elle et al., 2016-Yan et al., 2020	536.406	109.468	4.900	0.001
Ebabe Elle et al., 2016-Kim et al., 2021	539.252	90.858	5.935	0.000
Ebabe Elle et al., 2016-Braun et al., 2018	-540.282	69.420	-7.783	0.000
Ebabe Elle et al., 2016-Zhang et al., 2020	545.233	86.862	6.277	0.000
Ebabe Elle et al., 2016-Kienzle et al., 2017	-550.645	107.301	-5.132	0.000
Ebabe Elle et al., 2016-Chen et al., 2016	-558.540	92.518	-6.037	0.000
Ebabe Elle et al., 2016-Lu et al., 2018	-561.897	92.518	-6.073	0.000
Ebabe Elle et al., 2016-Guo et al., 2016	589.250	89.381	6.593	0.000
Ebabe Elle et al., 2016-Saroj and Rajput, 2018	-592.552	96.542	-6.138	0.000
Ebabe Elle et al., 2016-Gounani et al., 2018	-608.583	69.872	-8.710	0.000
Ebabe Elle et al., 2016-Zhao et al., 2019	614.219	105.336	5.831	0.000

Ebabe Elle et al., 2016-Liu et al., 2017	-619.727	91.663	-6.761	0.000
Ebabe Elle et al., 2016-Wu et al., 2019	686.135	121.022	5.670	0.000
Ebabe Elle et al., 2016-Zhou et al., 2017	-737.152	90.858	-8.113	0.000
Ebabe Elle et al., 2016-Wang et al., 2019	737.677	121.022	6.095	0.000
Ebabe Elle et al., 2016-Vejdani Noghreiyan et al., 2020	776.469	171.927	4.516	0.006
Ebabe Elle et al., 2016-Ferrauto et al., 2017	-783.385	159.054	-4.925	0.001
Ebabe Elle et al., 2016-Paris et al., 2016	811.719	129.525	6.267	0.000
Ebabe Elle et al., 2016-Wright et al., 2021	816.135	159.054	5.131	0.000
Ebabe Elle et al., 2016-Dréau et al., 2016	-827.647	114.563	-7.224	0.000
Ebabe Elle et al., 2016-Paatero et al., 2017	-988.719	121.022	-8.170	0.000
Martínez-Carmona et al., 2018-Zhou et al., 2017	598.433	142.262	4.207	0.026
Martínez-Carmona et al., 2018-Dréau et al., 2016	688.929	158.455	4.348	0.014
Martínez-Carmona et al., 2018-Paatero et al., 2017	850.000	163.186	5.209	0.000
Mohammadpour et al., 2019-Mannerström et al., 2016	290.719	63.202	4.600	0.004
Mohammadpour et al., 2019-Chou et al., 2017	350.338	61.421	5.704	0.000
Mohammadpour et al., 2019-Kim et al., 2021	384.510	79.107	4.861	0.001
Mohammadpour et al., 2019-Braun et al., 2018	385.539	53.121	7.258	0.000
Mohammadpour et al., 2019-Zhang et al., 2020	390.490	74.484	5.243	0.000
Mohammadpour et al., 2019-Kienzle et al., 2017	395.903	97.551	4.058	0.049
Mohammadpour et al., 2019-Chen et al., 2016	403.798	81.008	4.985	0.001
Mohammadpour et al., 2019-Lu et al., 2018	407.155	81.008	5.026	0.000
Mohammadpour et al., 2019-Guo et al., 2016	434.508	77.406	5.613	0.000
Mohammadpour et al., 2019-Saroj and Rajput, 2018	437.810	85.575	5.116	0.000
Mohammadpour et al., 2019-Gounani et al., 2018	453.841	53.711	8.450	0.000
Mohammadpour et al., 2019-Zhao et al., 2019	459.477	95.386	4.817	0.001

Mohammadpour et al., 2019-Liu et al., 2017	464.985	80.031	5.810	0.000
Mohammadpour et al., 2019-Wu et al., 2019	531.393	112.468	4.725	0.002
Mohammadpour et al., 2019-Zhou et al., 2017	582.410	79.107	7.362	0.000
Mohammadpour et al., 2019-Wang et al., 2019	582.935	112.468	5.183	0.000
Mohammadpour et al., 2019-Ferrauto et al., 2017	628.643	152.646	4.118	0.038
Mohammadpour et al., 2019-Paris et al., 2016	656.977	121.571	5.404	0.000
Mohammadpour et al., 2019-Wright et al., 2021	661.393	152.646	4.333	0.015
Mohammadpour et al., 2019-Dréau et al., 2016	672.905	105.486	6.379	0.000
Mohammadpour et al., 2019-Paatero et al., 2017	833.977	112.468	7.415	0.000
You et al., 2016-Paatero et al., 2017	-796.750	178.761	-4.457	0.008
Yang et al., 2019-Gounani et al., 2018	-347.427	69.872	-4.972	0.001
Yang et al., 2019-Zhou et al., 2017	-475.996	90.858	-5.239	0.000
Yang et al., 2019-Paris et al., 2016	-550.563	129.525	-4.251	0.021
Yang et al., 2019-Dréau et al., 2016	-566.491	114.563	-4.945	0.001
Yang et al., 2019-Paatero et al., 2017	-727.563	121.022	-6.012	0.000
Tran et al., 2018-Paatero et al., 2017	723.050	153.082	4.723	0.002
Nguyen et al., 2017-Braun et al., 2018	-265.313	61.071	-4.344	0.014
Nguyen et al., 2017-Gounani et al., 2018	-333.615	61.585	-5.417	0.000
Nguyen et al., 2017-Zhou et al., 2017	462.183	84.651	5.460	0.000
Nguyen et al., 2017-Paris et al., 2016	536.750	125.249	4.285	0.018
Nguyen et al., 2017-Dréau et al., 2016	-552.679	109.705	-5.038	0.000
Nguyen et al., 2017-Paatero et al., 2017	-713.750	116.434	-6.130	0.000
Fei et al., 2017-Braun et al., 2018	-235.068	46.434	-5.062	0.000

Fei et al., 2017-Gounani et al., 2018	-303.370	47.108	-6.440	0.000
Fei et al., 2017-Liu et al., 2017	-314.514	75.757	-4.152	0.033
Fei et al., 2017-Zhou et al., 2017	-431.939	74.781	-5.776	0.000
Fei et al., 2017-Paris et al., 2016	506.505	118.801	4.263	0.020
Fei et al., 2017-Dréau et al., 2016	-522.434	102.282	-5.108	0.000
Fei et al., 2017-Paatero et al., 2017	-683.505	109.468	-6.244	0.000
Maksimović-Ivanić et al., 2019-Paatero et al., 2017	-676.972	157.653	-4.294	0.017
Xie et al., 2016-Paatero et al., 2017	-646.850	153.082	-4.226	0.024
Cheng et al., 2017-Paatero et al., 2017	-597.125	130.549	-4.574	0.005
Li et al., 2018-Paatero et al., 2017	563.984	121.022	4.660	0.003
Mannerström et al., 2016-Paatero et al., 2017	-543.258	112.468	-4.830	0.001
Chou et al., 2017-Paatero et al., 2017	-483.639	111.477	-4.338	0.014
Braun et al., 2018-Paatero et al., 2017	448.437	107.129	4.186	0.028

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same. Asymptotic significances (2-sided tests) are displayed. The significance level is 0.05.

[a] Significance values have been adjusted by the Bonferroni correction for multiple tests.

Table S3. Normality Tests for different MSN Sizes

		Shapiro-Wilk		
	MSN Size	Statistic	df	Sig.
Viability	under100	0.992	136	0.619
	Between100&200	0.801	596	0.000
	Between200&300	0.881	309	0.000
	Between300&400	0.744	89	0.000
	Between400&500	0.933	46	0.011
	above500	0.902	64	0.000

Table S4. Normality Tests for different viability assay method groups

	Viability Assay Method	Shapiro-Wilk		
		Statistic	df	Sig.
Viability	Alamar Blue	0.962	9	0.817
	Annexin V/IP	0.779	12	0.005
	ATP-assay	0.823	31	0.000
	CCK-8 Assay	0.727	246	0.000
	CellTiter 96 AQueous Assay	0.950	8	0.713
	CellTiterGlo	0.718	41	0.000
	FACS	0.548	31	0.000
	MTS assay	0.957	30	0.257
	MTT	0.755	648	0.000
	NRU	0.865	16	0.023
	SRB	0.960	6	0.816
	WST-1	0.940	86	0.001
	WST-8	0.710	72	0.000

Table S5. Normality Tests for different incubation times

	Incubation time	Shapiro-Wilk		
		Statistic	df	Sig.
Viability	24 h	0.762	567	0.000
	48 h	0.806	467	0.000
	72 h	0.891	183	0.000

Table S6. Normality tests for different MSN zeta-potential

	Zeta-potential groups	Shapiro-Wilk		
		Statistic	df	Sig.
Viability	-30 and below	0.835	453	0.000
	-30 to -10	0.750	345	0.000
	-10 to +10	0.709	29	0.000
	+10 to +30	0.767	264	0.000
	+30 and above	0.816	149	0.000

Table S7. Normality tests for different functionalisation types.

Functionalisation Groups		Shapiro-Wilk		
		Statistic	df	Sig.
Viability	3- aminopropyl	0.926	22	0.103
	F2	0.891	5	0.364
	Ag-Nps	0.933	14	0.339
	Amine group (-NH2)	0.822	164	0.000
	F5	0.912	14	0.166
	Caffeic acid	0.817	8	0.044
	carboxyl functionalised	0.837	138	0.000
	F8	0.949	15	0.501
	F9	0.960	6	0.816
	F10	0.924	24	0.072

	F11	0.941	24	0.175
	F12	0.917	24	0.049
	concanavalin A	0.950	8	0.713
	DSPE-PEG2K-FA	0.891	15	0.070
	F15	0.863	10	0.084
	Fluorescein PEI-PEG	0.958	17	0.599
	F17	0.829	16	0.007
	F18	0.911	28	0.021
	Hyaluronic acid	0.931	16	0.249
	F20	0.899	6	0.371
	F21	0.913	16	0.129
	F22	0.892	14	0.085
	none	0.753	463	0.000
	OH	0.867	5	0.253
	PEG/COOH	0.948	36	0.089
	Phenylboronic acid	0.950	12	0.632
	F27	0.950	6	0.740
	polyacrylic acid	0.758	24	0.000
	polyethyleneimine	0.813	8	0.040
	F30	0.821	8	0.048
	Rutin	0.963	8	0.842
	F32	0.938	22	0.178
	F33	0.973	3	0.683
	F34	1.000	3	1.000
	F35	0.945	3	0.550
	F36	0.882	3	0.329
	Thiol-modified MSN	0.695	8	0.002
	Titanium	0.967	5	0.854
	F39	0.816	14	0.008
	F40	0.825	4	0.155

Table S8. Normality test for cell types' viability

Cell Type Groups		Shapiro-Wilk		
		Statistic	df	Sig.
Viability	3T3	0.705	6	0.007
	4T1	0.954	14	0.620
	A549	0.868	6	0.217
	A875	0.916	10	0.322
	B16-F10	0.967	10	0.866
	BALB/c 3T3	0.876	32	0.002
	BEAS-2B	0.831	36	0.000
	bEND.3	0.730	6	0.013
	C2C12	0.896	20	0.035
	Caco-2	0.954	40	0.103
	CCRF-CEM	0.981	8	0.966
	Colon-26	0.926	4	0.571
	COS7	0.962	10	0.805
	Daudi	0.978	10	0.950
	DMSCs	0.902	10	0.228
	EA.hy926	0.898	3	0.379
	HaCaT	0.798	14	0.005
	HaCaT-L	0.951	16	0.501
	HEK 293 T	0.956	22	0.421
	HEK-293	0.756	97	0.000
	HEK-293TRPA1	0.799	8	0.028
	HEK-293TRPM2	0.824	8	0.051
	HEK-293TRPM8	0.880	8	0.188
	HEK-293TRPV4	0.878	8	0.178
	HeLa	0.938	26	0.121
	HEP-G2	0.897	99	0.000
	HFF-1	0.837	48	0.000

HFLS	0.974	12	0.952
HL-7702	0.804	12	0.010
hMSCs	0.897	6	0.358
HOS	0.963	5	0.829
HT-29	0.961	9	0.809
Huh-7	0.982	4	0.911
HUVEC	0.805	24	0.000
Jurkat	0.923	10	0.384
L-02	0.979	54	0.440
L929	0.983	3	0.752
LNCaP	0.738	12	0.002
LS 174T	0.980	12	0.983
MC3T3-E1	0.896	4	0.410
MCF-10a	0.812	4	0.125
MCF-7	0.838	100	0.000
MDA-MB-231	0.687	32	0.000
MDCK	0.928	6	0.565
MMT	0.883	7	0.239
Mtag	0.686	7	0.003
NCM460	0.923	3	0.464
NIH-3T3	0.783	14	0.003
NR8383	0.809	16	0.004
PC-3	0.796	12	0.008
Raji	0.981	10	0.971
Ramos (RA1)	0.909	13	0.178
RAW 264.7	0.891	20	0.028
SCC-7	0.891	5	0.364
SH-SY5Y	0.699	5	0.009
SK-BR-3	0.825	4	0.155
SMMC-77721	0.939	4	0.648

SW480	0.936	3	0.510
SW620	0.883	5	0.325
THP-1	0.920	36	0.013
TZM-bl	0.913	155	0.000
U937	0.930	16	0.247
UKRV Mel15a	0.980	6	0.953
WeHi-164	0.942	11	0.542

Table S9. Mean ranks of MSN size groups

	MSN Size	N	Mean Rank
Viability	under100	136	710.14
	Between100&200	596	663.30
	Between200&300	309	590.52
	Between300&400	89	547.81
	Between400&500	46	592.70
	above500	64	297.30
	Total	1240	

Table S10. Post hoc test of MSN size groups

Sample 1-Sample 2	Test Statistic	Std. Error	Std. Test Statistic	Adj. Sig
above500-Between300&400	250.510	58.690	4.268	0.000
above500-Between200&300	293.213	49.180	5.962	0.000
above500-Between400&500	295.391	69.220	4.267	0.000
above500-Between100&200	365.991	47.105	7.770	0.000
above500-under100	412.835	54.282	7.605	0.000
Between300&400-under100	162.325	48.824	3.325	0.013
Between200&300-under100	119.622	36.850	3.246	0.018

Table S11. Mean ranks of viability assay method Groups

	ViabilityAssayMethod	N	Mean Rank
Viability	Alamar Blue	9	519.22
	Annexin V/IP	12	694.17
	ATP-assay	31	689.52
	CCK-8 Assay	246	631.61
	CellTiter 96 AQueous Assay	8	280.88
	CellTiterGlo	41	642.23
	FACS	31	770.16
	MTS assay	30	954.15
	MTT	648	557.41
	NRU	16	684.06
	SRB	6	729.50
	WST-1	86	759.74
	WST-8	72	719.08
	Total	1236	

Table S12. Post hoc test of viability assay method Groups

Sample 1-Sample 2	Test Statistic	Std. Error	Std. Test Statistic	Adj. Sig.
CellTiter 96 AQueous Assay-WST-1	-478.863	131.938	-3.629	0.022
CellTiter 96 AQueous Assay-FACS	-489.286	141.549	-3.457	0.043
CellTiter 96 AQueous Assay-MTS assay	-673.275	142.033	-4.740	0.000
MTT-WST-8	-161.674	44.342	-3.646	0.021
MTT-WST-1	-202.329	40.965	-4.939	0.000
MTT-MTS assay	396.740	66.660	5.952	0.000

CCK-8 Assay-MTS assay	-322.544	69.028	-4.673	0.000
CellTiterGlo-MTS assay	-311.918	85.759	-3.637	0.022

Table S13. Mean ranks of incubation time groups

	Incubation time	N	Mean Rank
Viability	24 h	567	631.26
	48 h	467	565.56
	72 h	183	650.88
	Total	1217	

Table S14. Post hoc test of incubation time groups

Sample 1-Sample 2	Test Statistic	Std. Error	Std. Test Statistic	Adj. Sig
48 h – 24 h	65.701	21.963	2.991	0.008
48 h – 72 h	-85.316	30.651	-2.783	0.016
24 h – 72 h	-19.615	29.881	-.656	1.000

Table S15. Mean ranks of MSN zeta-potential Groups

	Zeta-potential groups	N	Mean Rank
Viability	-30 and below	453	637.79
	-30 to -10	345	603.58
	-10 to +10	29	939.62
	+10 to +30	264	611.35
	+30 and above	149	561.20
	Total	1240	

Table S16. Post hoc test of MSNs' zeta-potential Groups

Sample 1 - Sample 2	Test Statistic	Std. Error	Std. Test Statistic	Adj. Sig
+30 and above - (-10 to +10)	378.419	72.681	5.207	0.000
-30 to -10 - (-10 to +10)	-336.041	69.236	-4.854	0.000
+10 to +30 - (-10 to +10)	328.270	70.055	4.686	0.000
-30 and below – (-10 to +10)	-301.827	68.593	-4.400	0.000

Table S17. Shapiro Wilk's Test of normality for functionalised and non-functionalised MSN groups in the dataset

	Functionalised or Non-Functionalised	Shapiro-Wilk		
		Statistic	df	Sig.
Viability	No Surface Functionalization	0.753	463	0.000
	Surface Functionalised	0.820	777	0.000

Table S18. Mean ranks of Functionalization Groups

	Functionalization Groups	N	Mean Rank
Viability	3- aminopropyl	22	416.66
	F2	5	604.80
	Ag-Nps	14	509.79
	Amine group (-NH2)	164	600.83
	F5	14	899.86
	Caffeic acid	8	78.50

	carboxyl functionalised	138	791.02
	F8	15	811.73
	F9	6	731.00
	F10	24	412.33
	F11	24	514.33
	F12	24	528.56
	concanavalin A	8	281.25
	DSPE-PEG2K-FA	15	751.93
	F15	10	408.50
	Fluorescein PEI-PEG	17	693.68
	F17	16	668.94
	F18	28	701.57
	Hyaluronic acid	16	695.34
	F20	6	643.33
	F21	16	651.44
	F22	14	681.43
	none	463	570.02
	OH	5	910.60
	PEG/COOH	36	688.26
	Phenylboronic acid	12	829.17
	F27	6	499.58
	polyacrylic acid	24	735.58
	polyethyleneimine	8	281.75
	F30	8	475.63
	Rutin	8	268.06
	F32	22	418.39
	F33	3	1231.17
	F34	3	830.67
	F35	3	1229.17
	F36	3	1235.67

	Thiol-modified MSN	8	739.00
	Titanium	5	919.50
	F39	14	970.68
	F40	4	700.88
	Total	1239	

Table S19. Post hoc test of functionalization Groups. [a] Significance values have been adjusted by the Bonferroni correction for multiple tests

Sample 1-Sample 2	Test Statistic	Std. Error	Std. Test Statistic	Adj. Sig.[a]
Caffeic acid-Amine group (-NH2)	522.332	129.554	4.032	0.043
Caffeic acid-PEG/COOH	-609.764	139.857	-4.360	0.010
Caffeic acid-Fluorescein PEI-PEG	-615.176	153.410	-4.010	0.047
Caffeic acid-F18	-623.071	143.444	-4.344	0.011
Caffeic acid-polyacrylic acid	-657.083	146.076	-4.498	0.005
Caffeic acid-DSPE-PEG2K-FA	-673.433	156.649	-4.299	0.013
Caffeic acid-carboxyl functionalised	-712.518	130.120	-5.476	0.000
Caffeic acid-F8	-733.233	156.649	-4.681	0.002
Caffeic acid-Phenylboronic acid	-750.667	163.318	-4.596	0.003
Caffeic acid-F5	821.357	158.583	5.179	0.000
Caffeic acid-OH	-832.100	203.984	-4.079	0.035
Caffeic acid-Titanium	-841.000	203.984	-4.123	0.029
Caffeic acid-F39	-892.179	158.583	-5.626	0.000
Caffeic acid-F35	-1150.667	242.239	-4.750	0.002
Caffeic acid-F33	-1152.667	242.239	-4.758	0.002
Caffeic acid-F36	-1157.167	242.239	-4.777	0.001
Rutin-carboxyl functionalised	522.956	130.120	4.019	0.046
Rutin-F39	-702.616	158.583	-4.431	0.007
concanavalin A-F39	-689.429	158.583	-4.347	0.011
polyethyleneimine-F39	-688.929	158.583	-4.344	0.011
F10-carboxyl functionalised	378.685	79.135	4.785	0.001

F10-F5	487.524	120.331	4.052	0.040
F10-F39	-558.345	120.331	-4.640	0.003
3- aminopropyl-carboxyl functionalised	-374.359	82.142	-4.557	0.004
3- aminopropyl-F39	-554.019	122.329	-4.529	0.005
F32-carboxyl functionalised	372.632	82.142	4.536	0.004
F32-F39	-552.292	122.329	-4.515	0.005
none-carboxyl functionalised	221.002	34.703	6.368	0.000
none-F39	-400.662	97.064	-4.128	0.029
Amine group (-NH2)-carboxyl functionalised	-190.186	41.333	-4.601	0.003

Table S20. Mean ranks of cell types Groups

	Cell Type	N	Mean Rank
Viability	3T3	6	773.75
	4T1	14	655.07
	A549	6	760.08
	A875	10	622.50
	B16-F10	10	758.05
	BALB/c 3T3	32	459.77
	BEAS-2B	36	758.47
	bEND.3	6	945.92
	C2C12	20	970.53
	Caco-2	40	291.44
	CCRF-CEM	8	395.00
	Colon-26	4	703.00
	COS7	10	529.70
	Daudi	10	956.50

	DMSCs	10	955.45
	EA.hy926	3	210.33
	HaCaT	14	717.00
	HaCaT-L	16	161.44
	HEK 293 T	22	511.89
	HEK-293	97	569.76
	HEK-293TRPA1	8	419.81
	HEK-293TRPM2	8	290.50
	HEK-293TRPM8	8	304.00
	HEK-293TRPV4	8	303.13
	HeLa	26	640.67
	HEP-G2	99	665.27
	HFF-1	48	732.72
	HFLS	12	678.00
	HL-7702	12	674.46
	hMSCs	6	927.08
	HOS	5	305.40
	HT-29	9	747.61
	Huh-7	4	1052.88
	HUVEC	24	793.69
	Jurkat	10	779.20
	L-02	54	544.61
	L929	3	359.00
	LNCaP	12	733.54
	LS 174T	12	211.42
	MC3T3-E1	4	384.25
	MCF-10a	4	633.50
	MCF-7	100	576.49
	MDA-MB-231	32	567.77
	MDCK	6	959.83

	MMT	7	883.64
	Mtag	7	1059.43
	NCM460	3	799.00
	NIH-3T3	14	693.50
	NR8383	16	472.06
	PC-3	12	738.54
	Raji	10	906.65
	Ramos (RA1)	13	414.69
	RAW 264.7	20	387.98
	SCC-7	5	605.00
	SH-SY5Y	5	275.60
	SK-BR-3	4	701.38
	SMMC-77721	4	829.50
	SW480	3	488.33
	SW620	5	530.60
	THP-1	36	538.22
	TZM-bl	155	683.53
	U937	16	962.75
	UKRV Mel15a	6	738.25
	WeHi-164	11	669.82
	Total	1240	

Table S21. Post hoc test of cell type Groups

Sample 1-Sample 2	Test Statistic	Std. Error	Std. Test Statistic	Adj. Sig
HaCaT-L-HEK-293	-408.325	96.627	-4.226	0.048
HaCaT-L-MCF-7	-415.048	96.421	-4.305	0.034
HaCaT-L-HEP-G2	-503.830	96.488	-5.222	0.000

HaCaT-L-TZM-bl	-522.095	94.032	-5.552	0.000
HaCaT-L-HaCaT	555.563	131.051	4.239	0.045
HaCaT-L-HFF-1	-571.281	103.375	-5.526	0.000
HaCaT-L-PC-3	-577.104	136.752	-4.220	0.049
HaCaT-L-BEAS-2B	597.035	107.596	5.549	0.000
HaCaT-L-Jurkat	-617.763	144.355	-4.279	0.038
HaCaT-L-HUVEC	-632.250	115.576	-5.470	0.000
HaCaT-L-MMT	-722.205	162.278	-4.450	0.017
HaCaT-L-Raji	-745.213	144.355	-5.162	0.000
HaCaT-L-hMSCs	-765.646	171.427	-4.466	0.016
HaCaT-L-bEND.3	784.479	171.427	4.576	0.010
HaCaT-L-DMSCs	794.013	144.355	5.500	0.000
HaCaT-L-Daudi	795.063	144.355	5.508	0.000
HaCaT-L-MDCK	-798.396	171.427	-4.657	0.006
HaCaT-L-U937	-801.313	126.607	-6.329	0.000
HaCaT-L-C2C12	809.088	120.110	6.736	0.000
HaCaT-L-Huh-7	-891.438	200.184	-4.453	0.017
HaCaT-L-Mtag	-897.991	162.278	-5.534	0.000
LS 174T-TZM-bl	-472.116	107.302	-4.400	0.022
LS 174T-HFF-1	521.302	115.576	4.510	0.013
LS 174T-BEAS-2B	547.056	119.367	4.583	0.009
LS 174T-HUVEC	582.271	126.607	4.599	0.009

LS 174T-Raji	-695.233	153.329	-4.534	0.012
LS 174T-DMSCs	744.033	153.329	4.853	0.002
LS 174T-Daudi	745.083	153.329	4.859	0.002
LS 174T-U937	-751.333	136.752	-5.494	0.000
LS 174T-C2C12	759.108	130.760	5.805	0.000
LS 174T-Mtag	-848.012	170.310	-4.979	0.001
HEK-293TRPM2-U937	-672.250	155.062	-4.335	0.029
HEK-293TRPM2-C2C12	680.025	149.804	4.539	0.011
Caco-2-MCF-7	-285.048	66.994	-4.255	0.042
Caco-2-HEP-G2	-373.830	67.091	-5.572	0.000
Caco-2-TZM-bl	-392.095	63.508	-6.174	0.000
Caco-2-HFF-1	-441.281	76.665	-5.756	0.000
Caco-2-BEAS-2B	467.035	82.268	5.677	0.000
Caco-2-HUVEC	-502.250	92.461	-5.432	0.000
Caco-2-Raji	-615.213	126.607	-4.859	0.002
Caco-2-DMSCs	-664.013	126.607	-5.245	0.000
Caco-2-Daudi	-665.063	126.607	-5.253	0.000
Caco-2-MDCK	-668.396	156.775	-4.263	0.041
Caco-2-U937	-671.313	105.927	-6.337	0.000
Caco-2-C2C12	679.088	98.070	6.925	0.000

Caco-2-Mtag	-767.991	146.715	-5.235	0.000
HEK-293TRPV4-U937	-659.625	155.062	-4.254	0.042
HEK-293TRPV4-C2C12	667.400	149.804	4.455	0.017
HEK-293TRPM8-U937	-658.750	155.062	-4.248	0.043
HEK-293TRPM8-C2C12	666.525	149.804	4.449	0.017
RAW 264.7-U937	-574.775	120.110	-4.785	0.003
RAW 264.7-C2C12	582.550	113.241	5.144	0.001
RAW 264.7-Mtag	671.454	157.261	4.270	0.039
Ramos (RA1)-C2C12	555.833	127.578	4.357	0.027
BALB/c 3T3-U937	-502.984	109.645	-4.587	0.009
BALB/c 3T3-C2C12	-510.759	102.074	-5.004	0.001
THP-1-C2C12	432.303	99.869	4.329	0.030
L-02-C2C12	425.914	93.736	4.544	0.011
HEK-293-C2C12	400.762	87.942	4.557	0.010
MCF-7-C2C12	394.040	87.716	4.492	0.014