sensors

MDPI

Supplementary Materials

Density distribution maps: a novel tool for subcellular distribution analysis and quantitative biomedical imaging

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Table 1. Median MTs intensity in MG-63 cells.

	Median intensity ± MAD	
Optical section	**CTR (n=17)**	**PTX-Ce6@-ker$_{ag}$ (n=14)**
1	24.0±5.00	782±197
2	36.0±8.00	918±233
3	53.0±11.0	991±250
4	76.0±17.0	920±236
5	123±27.0	781±193
6	210±46.0	683±163
7	347±76.0	752±195
8	460±105	717±180
9	525±128	828±216
10	563±143	857±236
11	555±148	862±237
12	553±147	789±214
13	524±141	726±198
14	460±124	663±181
15	377±103	-
16	277±72.0	-
17	199±50.0	-

Table 2. Statistical analysis of MTs LDI percentage in MG-63 cells.

	Median percentage (%) ± MAD		
LDI	**CTR (n=17)**	**PTX-Ce6@-ker$_{ag}$ (n=14)**	**p-value ($\underline{\leq 0.05}$)**
0	1.40±0.96	0.05±0.01	$\underline{\leq 10^{-5}}$
1	2.15±1.26	0.10±0.02	$\underline{\leq 10^{-5}}$
2	3.01±1.53	0.31±0.03	$\underline{\leq 10^{-5}}$
3	4.54±1.87	0.96±0.06	$\underline{\leq 10^{-5}}$
4	5.94±1.05	3.13±0.16	$\underline{\leq 10^{-5}}$
5	8.15±1.08	5.88±0.38	$\underline{\leq 10^{-3}}$
6	9.27±0.79	4.07±0.16	$\underline{\leq 10^{-5}}$
7	12.4±0.79	5.84±0.33	$\underline{\leq 10^{-3}}$
8	47.1±14.2	79.5±0.84	$\underline{\leq 10^{-5}}$

Table 3. Statistical analysis of hybrids LDI percentage in A549 sh/p53 cells.

LDI	Nucleus			Cytoplasm		
	Median percentage (%) ± MAD			Median percentage (%) ± MAD		
	CTR (n=14)	2 Gy (n=14)	p-value (≤0.05)	CTR (n=14)	2 Gy (n=14)	p-value (≤0.05)
0	0.32±0.13	1.63±0.97	$<10^{-4}$	0.44±0.12	1.86±0.60	$<10^{-5}$
1	0.88±0.26	2.39±1.65	$<10^{-3}$	0.95±0.28	3.02±0.87	$<10^{-5}$
2	1.81±0.42	3.84±1.74	$<10^{-2}$	2.89±0.40	4.79±0.93	$<10^{-5}$
3	4.24±0.73	6.07±2.45	0.02	7.85±0.98	9.06±1.29	0.05
4	7.50±1.11	10.0±3.01	0.08	13.4±1.17	12.1±1.42	0.07
5	9.91±1.05	11.5±1.83	0.05	14.9±0.89	13.4±0.95	$<10^{-2}$
6	10.6±1.03	11.0±1.37	0.30	12.2±0.38	12.6±1.03	0.73
7	13.6±1.02	13.1±1.71	0.80	15.0±0.38	14.2±0.99	$<10^{-2}$
8	51.1±5.05	41.3±12.7	0.01	32.0±3.14	28.0±6.29	0.07

Table 4. Median hybrids LDI percentage and blobs number in HeLa cells.

LDI	Median percentage (%) ± MAD				(Median blob number ($pixel^{-1}$) ± MAD) $*10^{-3}$			
	CTR (n=5)	Cortical (n=4)	Intermediate (n=3)	Scattered (n=3)	CTR (n=5)	Cortical (n=4)	Intermediate (n=3)	Scattered (n=3)
0	0.06±0.03	0.20±0.03	0.15±0.01	0.16±0.04	0.11±0.05	0.44±0.07	0.32±0.01	0.36±0.08
1	0.30±0.04	0.51±0.03	0.49±0.02	0.48±0.01	0.38±0.01	0.76±0.04	0.67±0.05	0.67±0.14
2	0.58±0.10	1.27±0.11	1.18±0.05	1.25±0.05	0.85±0.20	2.43±0.24	1.99±0.13	2.15±0.05
3	2.62±0.14	4.21±0.17	4.50±0.56	5.01±0.29	4.57±0.55	8.12±0.07	8.75±0.20	10.10±0.12
4	10.30±0.78	10.30±0.75	11.70±0.78	12.40±0.57	17.6±1.54	19.60±1.34	21.00±0.88	23.80±0.38
5	12.50±1.02	14.10±0.32	15.30±1.12	15.64±0.44	18.00±1.46	20.90±0.51	22.50±0.52	25.00±0.08
6	7.26±0.16	9.12±0.25	9.24±0.07	9.51±0.26	10.70±0.77	15.80±0.09	16.20±0.76	16.90±0.13
7	13.20±0.58	12.60±0.32	13.50±0.56	14.28±0.14	19.50±1.99	21.40±0.49	22.30±0.96	24.50±0.41
8	53.00±2.99	48.3±1.05	40.00±4.11	41.68±1.70	2.63±0.10	2.54±0.08	3.79±0.36	3.71±0.44

Table 5. Statistical analysis of hybrids LDI percentage and blob number in HeLa cells.

LDI	p-value (≤0.05)							
	LDI percentage (%)				Blob number ($pixel^{-1}$)			
	CTR-All	CTR-Cortical	CTR-Intermediate	CTR-Scattered	CTR-All	CTR-Cortical	CTR-Intermediate	CTR-Scattered
0	0.01	0.02	0.14	0.14	0.26	0.19	0.99	0.32
1	$<10^{-2}$	0.02	0.14	0.07	0.24	0.22	0.50	0.68
2	$<10^{-2}$	0.02	0.04	0.04	0.38	0.76	0.79	0.25
3	$<10^{-2}$	0.02	0.04	0.03	0.37	0.03	0.57	0.39
4	0.31	0.73	0.25	0.07	0.01	0.02	0.07	0.25
5	0.03	0.41	0.07	0.04	0.01	0.02	0.07	0.25
6	$<10^{-2}$	0.02	0.04	0.04	0.03	0.02	0.07	0.79
7	0.31	0.90	0.57	0.04	$<10^{-2}$	0.02	0.04	0.07
8	$<10^{-2}$	0.06	0.04	0.04	0.01	0.02	0.07	0.29

Table 6. Variance of hybrids LDI percentage and blob number in HeLa cells.

LDI	Variance							
	LDI percentage (%)				Blob number (pixel^{-1}) *10^{-7}			
	All (n=10)	Cortical (n=4)	Intermediate (n=3)	Scattered (n=3)	All (n=10)	Cortical (n=4)	Intermediate (n=3)	Scattered (n=3)
0	0.003	0.002	0.002	0.004	0.15	0.09	0.10	0.17
1	0.01	0.002	0.01	0.01	0.09	0.05	0.03	0.22
2	0.03	0.05	0.04	0.03	1.23	1.94	0.24	0.66
3	0.32	0.14	0.67	0.10	11.2	3.16	14.6	3.02
4	1.44	0.89	1.02	0.40	41.1	29.7	9.36	16.4
5	1.48	0.35	2.61	0.50	35.4	30.9	21.3	11.5
6	0.12	0.21	0.05	0.08	7.38	6.58	10.5	1.88
7	0.76	0.75	0.67	0.04	21.0	16.2	10.4	9.06
8	15.8	9.85	21.4	4.94	4.42	2.17	3.19	2.08

Table 7. Abbreviations.

Ab	**Antibody**
CT	Computed Tomography
CTR	Control
CV	Coefficient of Variation
DMM	Density Distribution Map
FG	Foreground
FN	False Negative
FNR	False Negative Rate
FP	False Positive
GUI	Graphical User Interface
LDI	Local Density Index
MAD	Median Absolute Deviation
MIP	Maximum Intensity Projection
MT	Microtubule
NCC	Normalized Cross Correlation
PTX	Paclitaxel
SDR	Stoichiometric Detection Rate
SE	Structuring Element
SMLM	Single-Molecule Localization Microscopy
TN	True Negative
TP	True Positive
TPR	True Positive Rate
V2R	Vasopressin Receptor 2