REFERENCES

Alberts, B. (2002). *Microbiology of the Cell.* New York: Garland Science.

Andrea Ravasio, A. P.-M. (2015). Regulation of epithelial cell organization by tuning cell-substrate. *Integral Biology*.

Braga, V. (2002). Epithelial Cell Shape: Cadherins and Small GTPases. *Experimental Cell Research*.

Carter, S. (1965). Principles of Cell Motility: The Direction of Cell Movement and Cancer Invasion. *Nature*.

Colin D. Paul, P. M. (2017). Cancer cell motility: lessons from migration in confined spaces. *Nature Review Cancer*.

Cynthia L. Adams, Y.-T. C. (1998). Mechanisms of Epithelial Cell–Cell Adhesion and Cell Compaction Revealed by High-resolution Tracking of E-Cadherin–Green Fluorescent Protein. *The Journal of Cell Biology*.

D. Zink, A. H. (2004). Nuclear structure in cancer cells. *Nature Reviews Cancer*.

De Pascalis, E.-M. (2017). Single and collective cell migration: the mechanics of adhesions. *Molecular Biology of the Cell*, 1833-1846.

Frances E. Lock, N. A. (2009). Distinct Roles for ROCK1 and ROCK2 in the Regulation of Keratinocyte Differentiation. *PLOS*.

Franz, C., Jones, G., & Ridley, A. (2002). Cell Migration in Development and Disease. *Developmental Cell*, 153-158.

Giampieri, S., Manning, C., Hooper, S., Jones, L., Hill, C. S., & Sahai, E. (2009). Localised and reversible TGFβ signalling switches breast cancer cells from cohesive to single cell motility. *National Cell Biology*.

Gumbiner, G. (1996). Cell adhesion: the molecular basis of tissue architecture and morphogenesis. *CellPress*, 345-357.

Higgs, H. N., & Pollard, T. D. (2001). Regulation of Actin Filament Network Formation Through ARP2/3 Complex: Activation by a Diverse Array of Proteins. *Annual Review of Biochemistry*.

Huang, S., & C. P. Brangwynne, D. E. (2005). Symmetry-breaking in mammalian cell cohort migration during tissue pattern formation: role of random-walk persistence. *Cell Motility Cytoskeleton*, 201-213.

Ikie, C. (2016). *Micropattern cell tracking in MATLAB: a tool for the quantitative analysis of keratinocyte doublets cellular dynamics.*

Ilina, O., & Friedl, P. (2009). Mechanisms of collective cell migration at a glance. *Journal of Cell Science*.

Iurulli, N. (2017). *An Investigation of Different Levels of Cellular Tension upon Cell Motility.*

Jaffe, A., & Hall, A. (2005). Rho GTPases: biochemistry and biology. *Annual Review of Cell and Developmental Biology*.

Jaffe, A., & Hall, A. (2005). Rho GTPases: biochemistry and biology. *Annual Reviews Cell and Development Biology*.

Kalaji R, W. A. (2012). ROCK1 and ROCK2 regulate epithelial polarisation and geometric cell shape. *Biology of the Cell*.

Kalaji, R., Wheeler, A. P., Erasmus, J. C., Lee, S. Y., Endres, R. G., Cramer, L. P., & Braga, V. M. (2012). ROCK1 and ROCK2 regulate epithelial polarisation and geometric cell shape. *Biology of the Cell*, 435-451.

Li, L., He, Y., Zhao, M., & Jiang, J. (2015). Collective cell migration: Implications for wound healing and cancer invasion . *Burns and Trauma*.

Liao JK, S. M. (2007). Rho kinase (ROCK) inhibitors. *Journal of Cardiovascular Pharmacology*.

Mammoto T, I. D. (2010). Mechanical control of tissue and organ development. *Development*.

Mayor, R., & Etienne-Manneville, S. (2016). The front and rearof collective cell migration. *Nature Reviews Molecular Cell Biology volume*.

Mege, R., Gavard, J., & Lambert, M. (2006). Regulation of cell-cell junctions by the cytoskeleton. *Current Opinion in Cell Biology*.

Mendosa, A., Na, T.-Y., & Gumbiner, B. (2018). E-cadherin in Contact Inhibition and Cancer. *Oncogene*.

Mendosa, A., Na, T.-Y., & Gumbiner, B. M. (2018). E-cadherin in Contact Inhibition and Cancer. *Oncogene*, 4769-4780.

Mierke, C. (2019). The matrix environmental and cell mechanical properties regulate cell migration and contribute to the invasive phenotype of cancer cells. *IOP Publishing*.

Philipp J. Albert, U. S. (2016). Dynamics of Cell Ensembles on Adhesive Micropatterns: Bridging the Gap between Single Cell Spreading and Collective Cell Migration. *PLOS Computer Biotechnology*.

Plodinec M, L. M.-D.-A. (2012). The nanomechanical signature of breast cancer. *Nature Nanotechnology*.

Ranjan, K. S. (2016). *Regulation of Junction Configuration by Cell Tension.* London: Imperial College London.

Revathi Ananthakrishnan1, A. E. (2007). The Forces Behind Cell Movement. *International Journal of Biological Sciences*, 303-317.

Ridley, A. J. (2001). Rho GTPases and cell migration. *Journal of Cell Science*.

S. Giampieri, C. M. (2009). Localized and reversible TGFbeta signalling switches breast cancer cells from cohesive to single cell motility. *Nature Cell Biology*.

Sandra Kumper, F. K. (2016). Rho-associated kinase (ROCK) function is essential for cell cycle progression, senescence and tumorigenesis. *eLIFE*.

Sarah M Heissler, J. R. (2014). Myosin light chains: Teaching old dogs new tricks. *Bioarchitecture*.

Sarita Koride, A. J. (2018). *Epithelial vertex models with active biochemical regulation of contractility can explain organized collective cell motility.*

Schnell, U. C., & Giepmans, B. N. (2013). EpCAM: Structure and function in health and disease. *Biochimia et Biophysica* .

Smutny, M., Cox, H., Leerberg, J., Kovacs, E., Conti, M., Ferguson, C., . . . Yap, A. (2010). Myosin II isoforms identify distinct functional modules that support integrity of the epithelial zonula adherens. *Nature Cell Biology*, 696-702.

Sri Ranjan, K. (2016). Regulation of Junction Configuration by Cell Tension.

T. Lecuit, A. S. (2015). E-cadherin junctions as active mechanical integrators in tissue dynamics. *Nature Cell Biology*, 533-539.

X. Trepat, Z. C. (2012). Cell Migration. *Comprehensive Physiology*, 2369-2392.

Zink, D., Fischer, A. H., & Nickerson, J. A. (2004). Nuclear Structure in Cancer cells. *Nature Reviews Cancer*.

APPENDIX

Table Analyzed	Junction Angle Validation
Kruskal-Wallis test	
P value	0.5691
Exact or approximate P value?	Gaussian Approximation
P value summary	ns
Do the medians vary signif. (P < 0.05)	No
Number of groups	3
Kruskal-Wallis statistic	1.127

Number of values	28	28	28
Minimum	0.0	0.0	0.0
25% Percentile	58.94	67.06	48.56
Median	143.1	136.9	107.2
75% Percentile	222.6	199.0	194.9
Maximum	278.7	251.1	241.4
Mean	140.9	132.5	118.1
Std. Deviation	87.95	75.41	77.96
Std. Error	16.62	14.25	14.73
Lower 95% CI	106.8	103.3	87.91
Upper 95% CI	175.0	161.8	148.4

Table Analyzed	Junction Angle (Control) - NB Final
Kruskal-Wallis test	
P value	0.3268
Exact or approximate P value?	Gaussian Approximation
P value summary	ns
Do the medians vary signif. (P < 0.05)	No
Number of groups	3
Kruskal-Wallis statistic	2.237

Number of values	28	28	28
Minimum	0.0	0.0	0.0
25% Percentile	78.37	49.52	69.36
Median	226.8	168.7	160.1
75% Percentile	361.3	287.3	297.2
Maximum	458.2	365.8	395.0
Mean	223.0	168.5	182.4
Std. Deviation	148.1	119.7	126.1
Std. Error	27.99	22.63	23.82
Lower 95% CI	165.6	122.0	133.5
Upper 95% CI	280.4	214.9	231.3

Table Analyzed	Junction Angle (Y-compound) - NB Final
Kruskal-Wallis test	
P value	0.0095
Exact or approximate P value?	Gaussian Approximation
P value summary	**
Do the medians vary signif. (P < 0.05)	Yes
Number of groups	3
Kruskal-Wallis statistic	9.321

Number of values	28	28	28
Minimum	0.0	0.0	0.0
25% Percentile	50.03	107.1	54.40
Median	133.0	265.7	143.3
75% Percentile	220.2	443.9	273.0
Maximum	286.0	579.7	355.4
Mean	135.6	275.8	161.3
Std. Deviation	91.16	183.1	115.5
Std. Error	17.23	34.61	21.83
Lower 95% CI	100.2	204.8	116.5
Upper 95% CI	170.9	346.8	206.1

Table Analyzed	Incremental Junction Speed (NB Control)
Kruskal-Wallis test	
P value	0.0720
Exact or approximate P value?	Gaussian Approximation
P value summary	ns
Do the medians vary signif. (P < 0.05)	No
Number of groups	3
Kruskal-Wallis statistic	5.261

Number of values	27	27	27
Minimum	2.034	-5.484	-4.027
25% Percentile	2.694	1.592	1.591
Median	3.155	2.789	2.630
75% Percentile	4.088	3.591	3.656
Maximum	4.718	5.498	4.959
Mean	3.315	2.431	2.547
Std. Deviation	0.7683	2.035	1.714
Std. Error	0.1479	0.3917	0.3298
Lower 95% CI	3.011	1.626	1.869
Upper 95% CI	3.619	3.236	3.225

Table Analyzed	Incremental Junction Speed (NB inhi)
Kruskal-Wallis test	
P value	< 0.0001
Exact or approximate P value?	Gaussian Approximation
P value summary	****
Do the medians vary signif. (P < 0.05)	Yes
Number of groups	3
Kruskal-Wallis statistic	48.57

Number of values	27	27	27
Minimum	0.8076	3.174	1.392
25% Percentile	1.682	3.606	1.835
Median	2.190	4.233	2.595
75% Percentile	2.533	4.919	3.211
Maximum	3.028	5.619	4.175
Mean	2.119	4.294	2.632
Std. Deviation	0.5380	0.7871	0.8479
Std. Error	0.1035	0.1515	0.1632
Lower 95% CI	1.906	3.983	2.297
Upper 95% CI	2.331	4.606	2.968

Table Analyzed	Junction Angle Distance (NB Control)
Kruskal-Wallis test	
P value	0.2461
Exact or approximate P value?	Gaussian Approximation
P value summary	ns
Do the medians vary signif. (P < 0.05)	No
Number of groups	3
Kruskal-Wallis statistic	2.804

Number of values	28	28	28
Minimum	0.0	0.0	0.0
25% Percentile	1724	1040	1457
Median	4989	3543	3362
75% Percentile	7948	6033	6242
Maximum	10081	7683	8296
Mean	4906	3538	3831
Std. Deviation	3258	2515	2647
Std. Error	615.8	475.2	500.3
Lower 95% CI	3643	2563	2804
Upper 95% CI	6169	4513	4857

Table Analyzed	Junction Angle Distance (NB Y-inhi)
Kruskal-Wallis test	
P value	< 0.0001
Exact or approximate P value?	Gaussian Approximation
P value summary	****
Do the medians vary signif. (P < 0.05)	Yes
Number of groups	3
Kruskal-Wallis statistic	20.37

Number of values	28	28	28
Minimum	0.0	0.0	0.0
25% Percentile	500.3	1928	1088
Median	1330	4783	2865
75% Percentile	2202	7991	5460
Maximum	2860	10435	7108
Mean	1356	4965	3225
Std. Deviation	911.6	3296	2310
Std. Error	172.3	623.0	436.6
Lower 95% CI	1002	3686	2330
Upper 95% CI	1709	6243	4121

Table Analyzed	Anticlcockwise Preference_Circle
Column A	Control
vs	vs
Column B	Inhibitor
Mann Whitney test	
P value	< 0.0001
Exact or approximate P value?	Gaussian Approximation
P value summary	****
Are medians signif. different? (P < 0.05)	Yes
One- or two-tailed P value?	Two-tailed
Sum of ranks in column A,B	1107 , 378
Mann-Whitney U	0.0

Number of values	27	27
Minimum	17.00	5.000
25% Percentile	19.00	7.000
Median	20.00	7.000
75% Percentile	20.00	9.000
Maximum	21.00	10.00
Mean	19.52	7.519
Std. Deviation	1.122	1.369
Std. Error	0.2160	0.2635
Lower 95% CI	19.07	6.977
Upper 95% CI	19.96	8.060

Table Analyzed	Anticlockwise Preference_Square
Column A	Control
vs	vs
Column B	Inhibitor
Mann Whitney test	
P value	0.0018
Exact or approximate P value?	Gaussian Approximation
P value summary	**
Are medians signif. different? (P < 0.05)	Yes
One- or two-tailed P value?	Two-tailed
Sum of ranks in column A,B	920.5 , 564.5
Mann-Whitney U	186.5

Number of values	27	27
Minimum	13.00	13.00
25% Percentile	16.00	15.00
Median	18.00	16.00
75% Percentile	18.00	17.00
Maximum	21.00	18.00
Mean	17.26	15.74
Std. Deviation	1.992	1.228
Std. Error	0.3834	0.2363
Lower 95% CI	16.47	15.26
Upper 95% CI	18.05	16.23

Table Analyzed	Anticlockwise Preference Triangle
Column A	Control
vs	vs
Column B	Inhibitor
Mann Whitney test	
P value	0.3605
Exact or approximate P value?	Gaussian Approximation
P value summary	ns
Are medians signif. different? (P < 0.05)	No
One- or two-tailed P value?	Two-tailed
Sum of ranks in column A,B	795 , 690
Mann-Whitney U	312.0

Number of values	27	27
Minimum	12.00	14.00
25% Percentile	15.00	15.00
Median	17.00	16.00
75% Percentile	18.00	17.00
Maximum	21.00	20.00
Mean	16.33	15.93
Std. Deviation	2.201	1.328
Std. Error	0.4237	0.2556
Lower 95% CI	15.46	15.40
Upper 95% CI	17.20	16.45

Table Analyzed	Rotation Preference (Control)
Kruskal-Wallis test	
P value	< 0.0001
Exact or approximate P value?	Gaussian Approximation
P value summary	****
Do the medians vary signif. (P < 0.05)	Yes
Number of groups	3
Kruskal-Wallis statistic	29.20

Number of values	27	27	27
Minimum	0.0	0.0	0.0
25% Percentile	1.000	3.000	3.000
Median	1.000	3.000	4.000
75% Percentile	2.000	5.000	6.000
Maximum	4.000	7.000	8.000
Mean	1.481	3.519	4.148
Std. Deviation	1.122	1.740	2.013
Std. Error	0.2160	0.3349	0.3875
Lower 95% CI	1.038	2.830	3.352
Upper 95% CI	1.925	4.207	4.945

Table Analyzed	Rotation Frequency (inhibitor)
Kruskal-Wallis test	
P value	< 0.0001
Exact or approximate P value?	Gaussian Approximation
P value summary	****
Do the medians vary signif. (P < 0.05)	Yes
Number of groups	3
Kruskal-Wallis statistic	23.64

Number of values	27	27	27
Minimum	0.0	0.0	0.0
25% Percentile	1.000	1.000	3.000
Median	3.000	2.000	4.000
75% Percentile	3.000	3.000	5.000
Maximum	5.000	5.000	6.000
Mean	2.481	2.259	4.074
Std. Deviation	1.369	1.228	1.328
Std. Error	0.2635	0.2363	0.2556
Lower 95% CI	1.940	1.774	3.549
Upper 95% CI	3.023	2.745	4.599

Table Analyzed	Square (control + inhibitor) - NB Final
Column A	Control
vs	vs
Column B	Inhibitor
Mann Whitney test	
P value	0.0305
Exact or approximate P value?	Gaussian Approximation
P value summary	*
Are medians signif. different? (P < 0.05)	Yes
One- or two-tailed P value?	Two-tailed
Sum of ranks in column A,B	665.5 , 930.5
Mann-Whitney U	259.5

Number of values	28	28
Minimum	0.0	0.0
25% Percentile	49.52	107.1
Median	168.7	265.7
75% Percentile	287.3	443.9
Maximum	365.8	579.7
Mean	168.5	275.8
Std. Deviation	119.7	183.1
Std. Error	22.63	34.61
Lower 95% CI	122.0	204.8
Upper 95% CI	214.9	346.8

Table Analyzed	Circle (control + inhibitor) - NB Final
Column A	Control
vs	vs
Column B	Inhibitor
Mann Whitney test	
P value	0.0293
Exact or approximate P value?	Gaussian Approximation
P value summary	*
Are medians signif. different? (P < 0.05)	Yes
One- or two-tailed P value?	Two-tailed
Sum of ranks in column A,B	931.5 , 664.5
Mann-Whitney U	258.5

Number of values	28	28
Minimum	0.0	0.0
25% Percentile	78.37	50.03
Median	226.8	133.0
75% Percentile	361.3	220.2
Maximum	458.2	286.0
Mean	223.0	135.6
Std. Deviation	148.1	91.16
Std. Error	27.99	17.23
Lower 95% CI	165.6	100.2
Upper 95% CI	280.4	170.9

Table Analyzed	Triangle (control + inhibitor) - NB Final
Column A	Control
vs	vs
Column B	Inhibitor
Mann Whitney test	
P value	0.2446
Exact or approximate P value?	Gaussian Approximation
P value summary	ns
Are medians signif. different? (P < 0.05)	No
One- or two-tailed P value?	Two-tailed
Sum of ranks in column A,B	726.5 , 869.5
Mann-Whitney U	320.5

Number of values	28	28
Minimum	0.0	0.0
25% Percentile	54.47	54.40
Median	104.0	143.3
75% Percentile	199.5	273.0
Maximum	248.5	355.4
Mean	121.2	161.3
Std. Deviation	79.68	115.5
Std. Error	15.06	21.83
Lower 95% CI	90.30	116.5
Upper 95% CI	152.1	206.1