Supplementary Information (SI) for Nanoscale.

An engineered platform to study the influence of extracellular matrix nanotopography on cell ultrastructure

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Supplemental Information

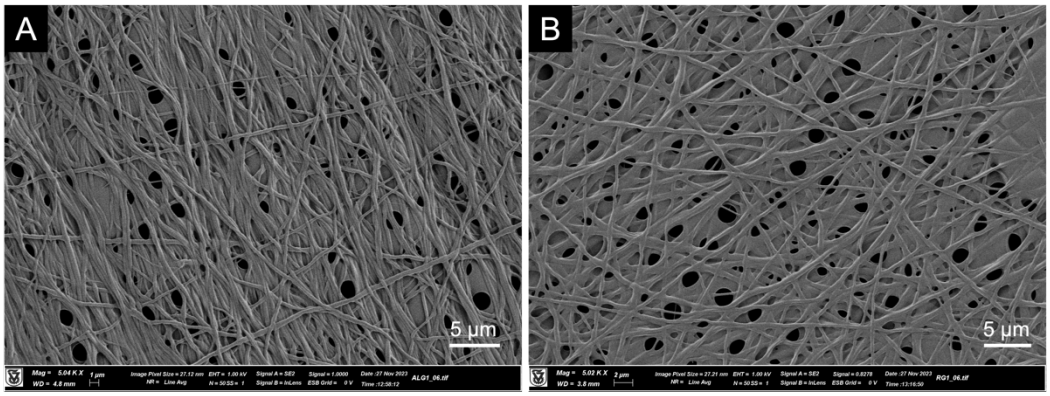

Figure S1: HR-SEM images of gelatin fibers electrospun from a 28% solution directly onto gold TEM grids (UltrAufoil 200 mesh R2,2). (A) Aligned fibers. (B) Randomly oriented fibers.

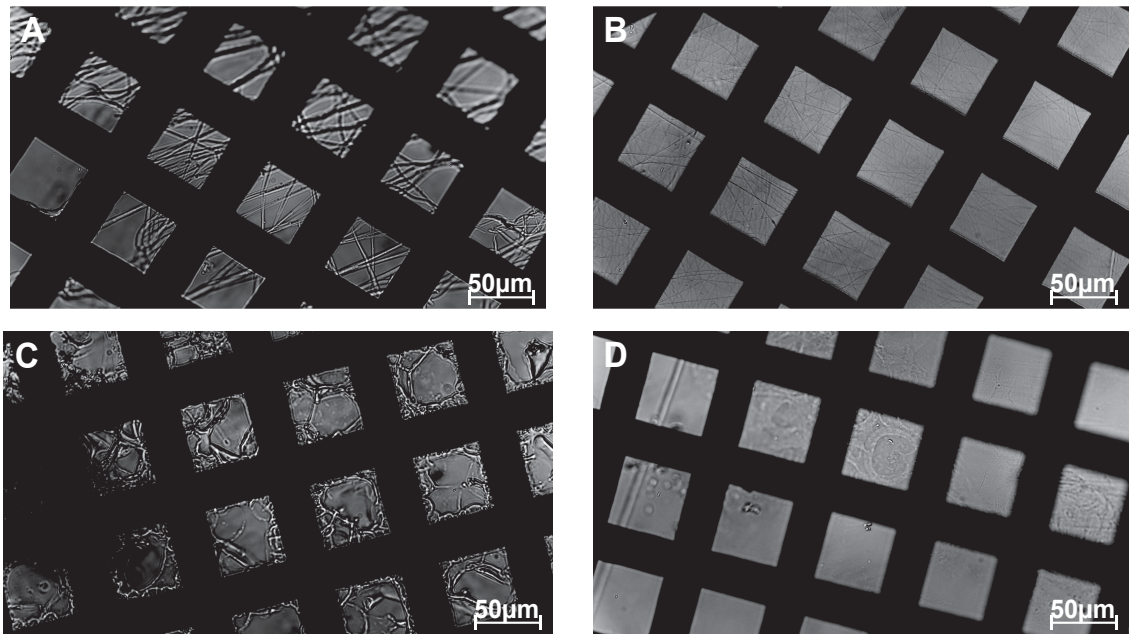

Figure S2: Micrographs of gelatin fibers after introduction to deionized water show that crosslinking (here with EDC) is critical for maintaining fiber structure. (A) Crosslinked 20% gelatin fibers with 50/50 v/v TFE/DI water. (B) Crosslinked 30% gelatin fibers with 2/8 v/v acetic acid/DI water. (C-D) Loss of structure in aqueous solutions without crosslinking. (C) 20% gelatin fibers with 50/50 v/v TFE/DI water. (D) 30% gelatin fibers with 2/8 v/v acetic acid/DI water.

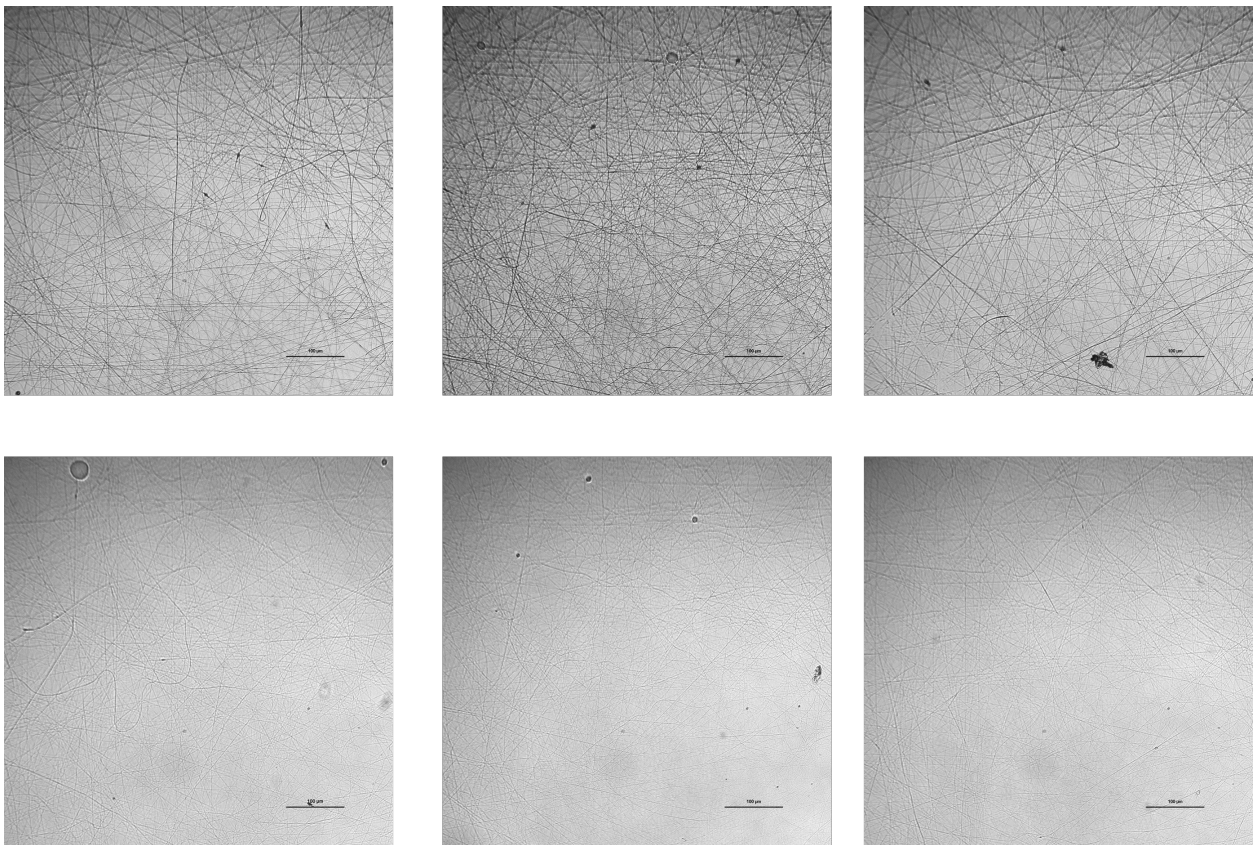

Figure S3: Images of of electrospun and cross-linked gelatin nanofibers, before (top row) and after (bottom row) a half hour of immersion in deionized water. The fibers do not appear to have undergone degradation. Scale bar, 100 μm.

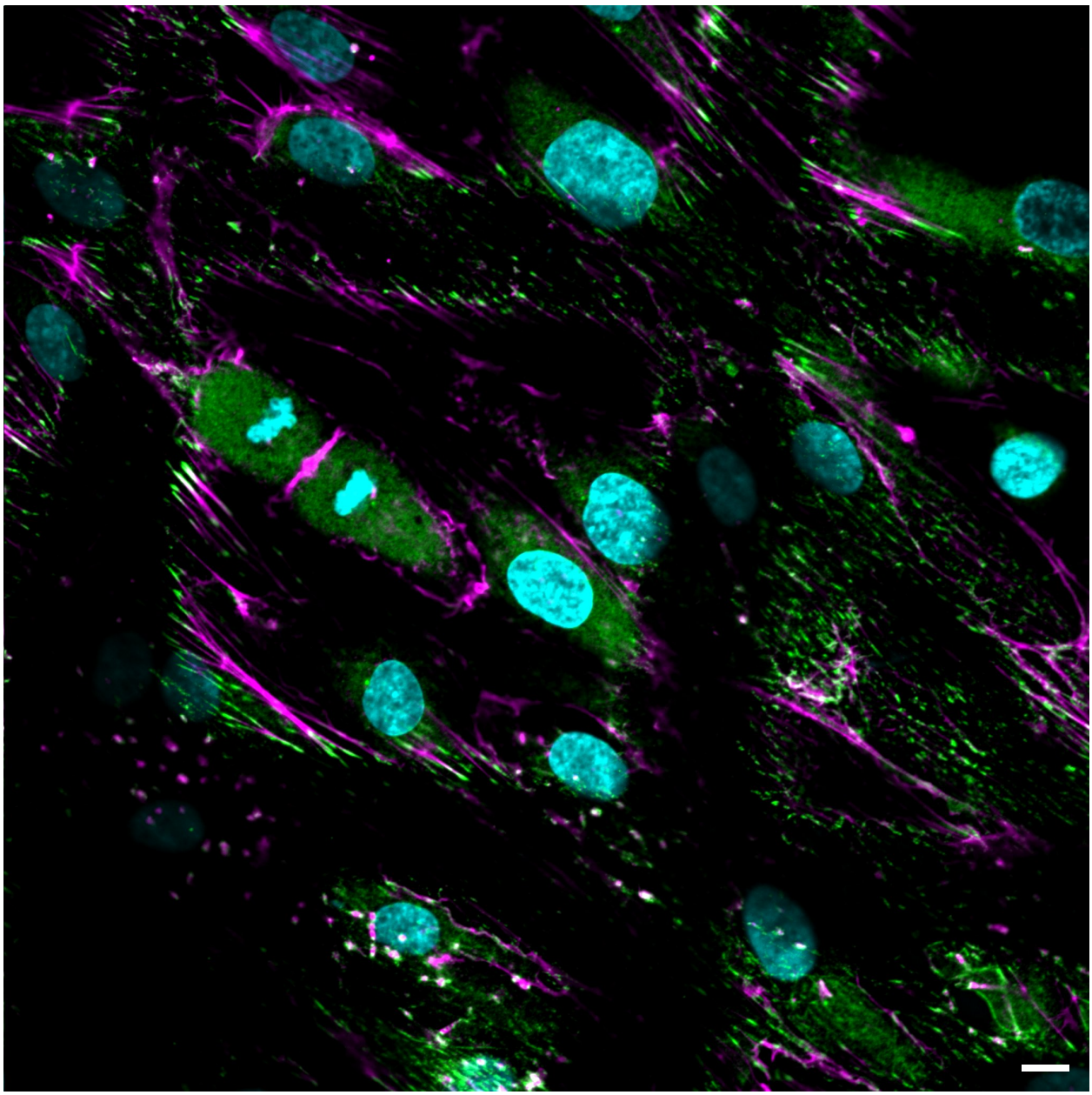

Figure S4: Micrograph of fixed cells on electrospun and cross-linked gelatin nanofibers on EM grids. Composite image shows F-actin (magenta), nuclei (cyan), and paxillin (green). A cell appears to be dividing. Scale bar, 10 μm.

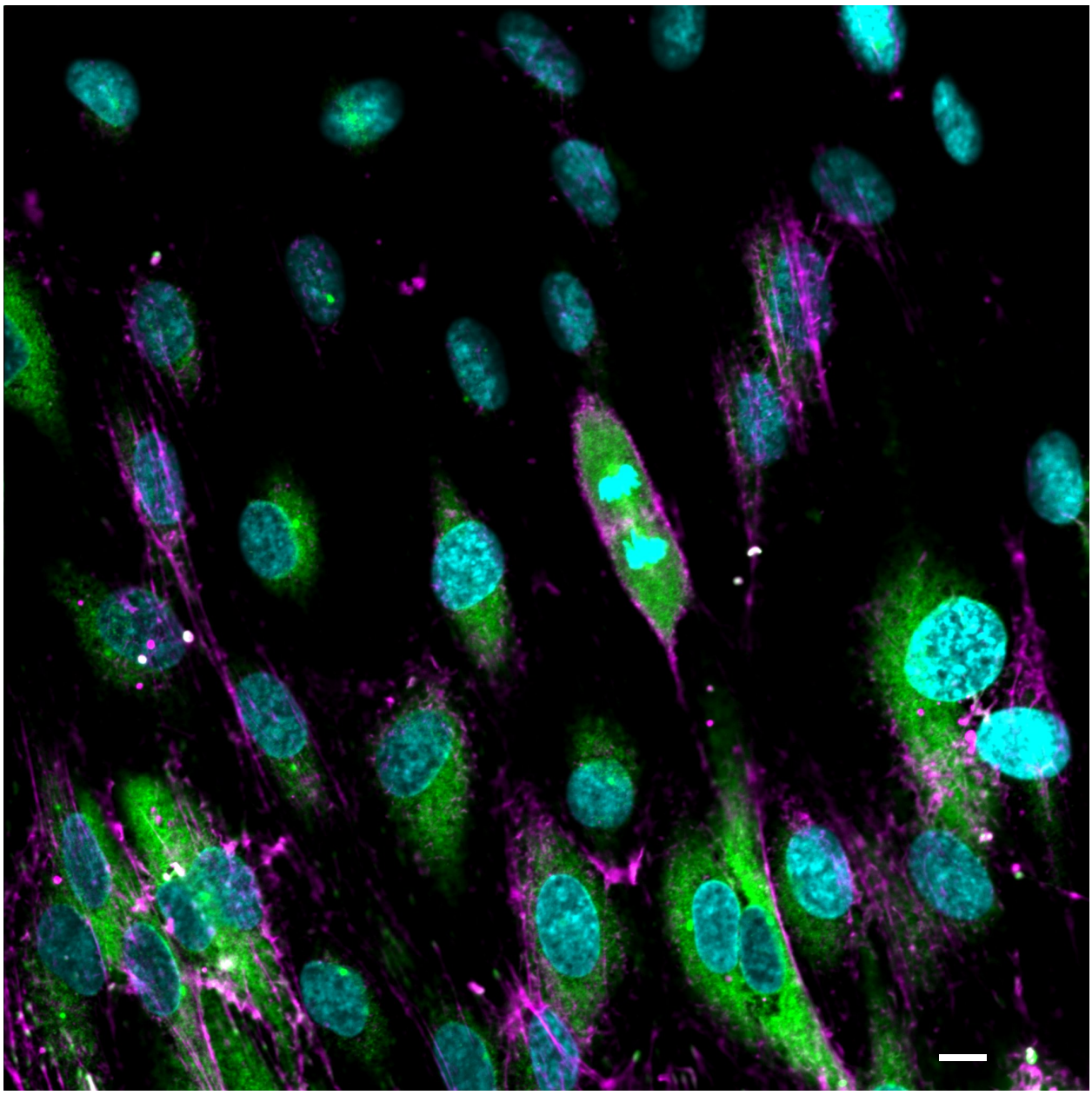

Figure S5: Micrograph of fixed cells on electrospun and cross-linked gelatin nanofibers on EM grids. Composite image shows F-actin (magenta), nuclei (cyan), and paxillin (green). A cell appears to be dividing. Scale bar, 10 μm.

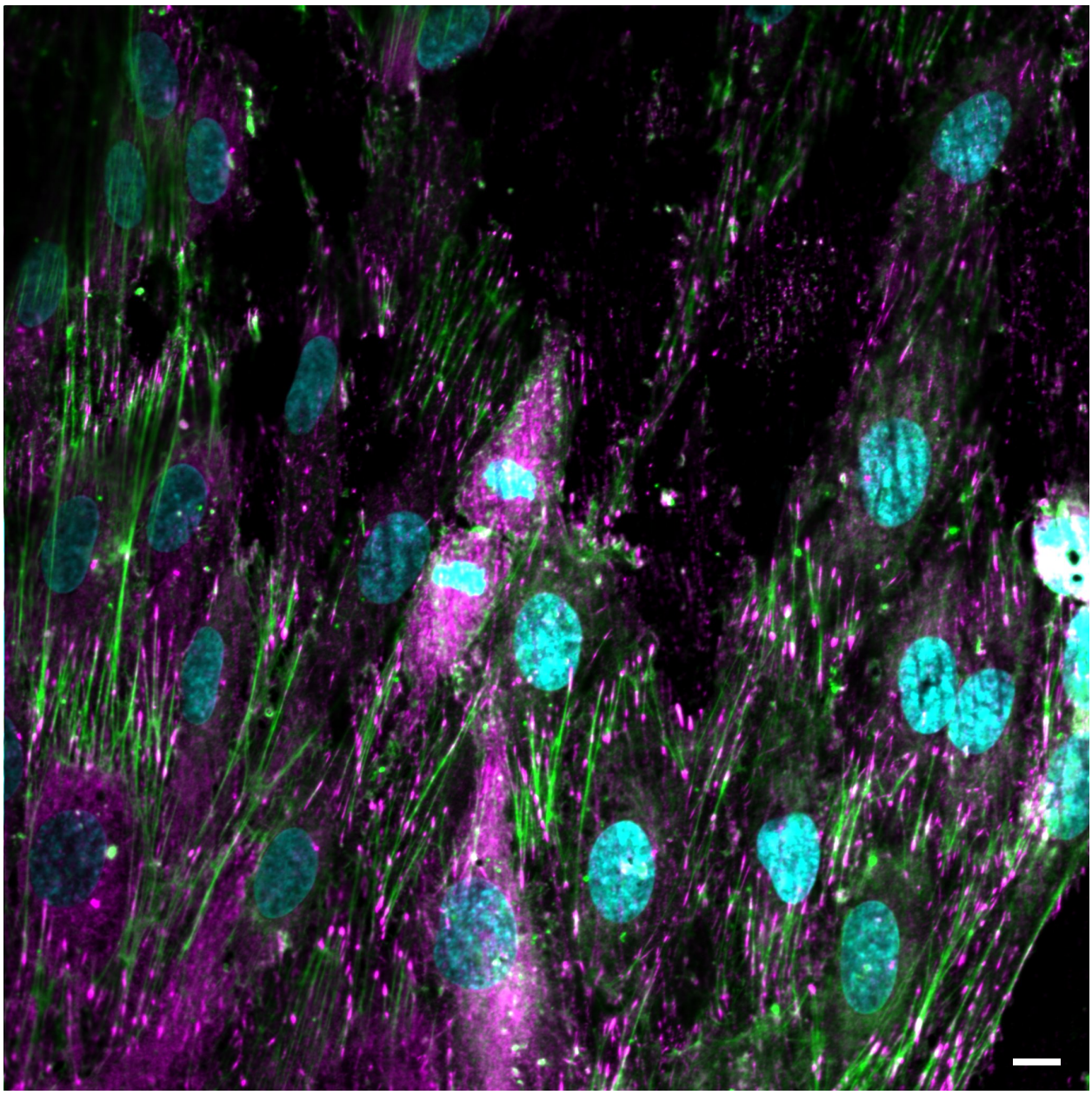

Figure S6: Micrograph of fixed cells on electrospun and cross-linked gelatin nanofibers on EM grids. Composite image shows F-actin (green), nuclei (cyan), and paxillin (magenta). A cell appears to be dividing. Scale bar, 10 μm.

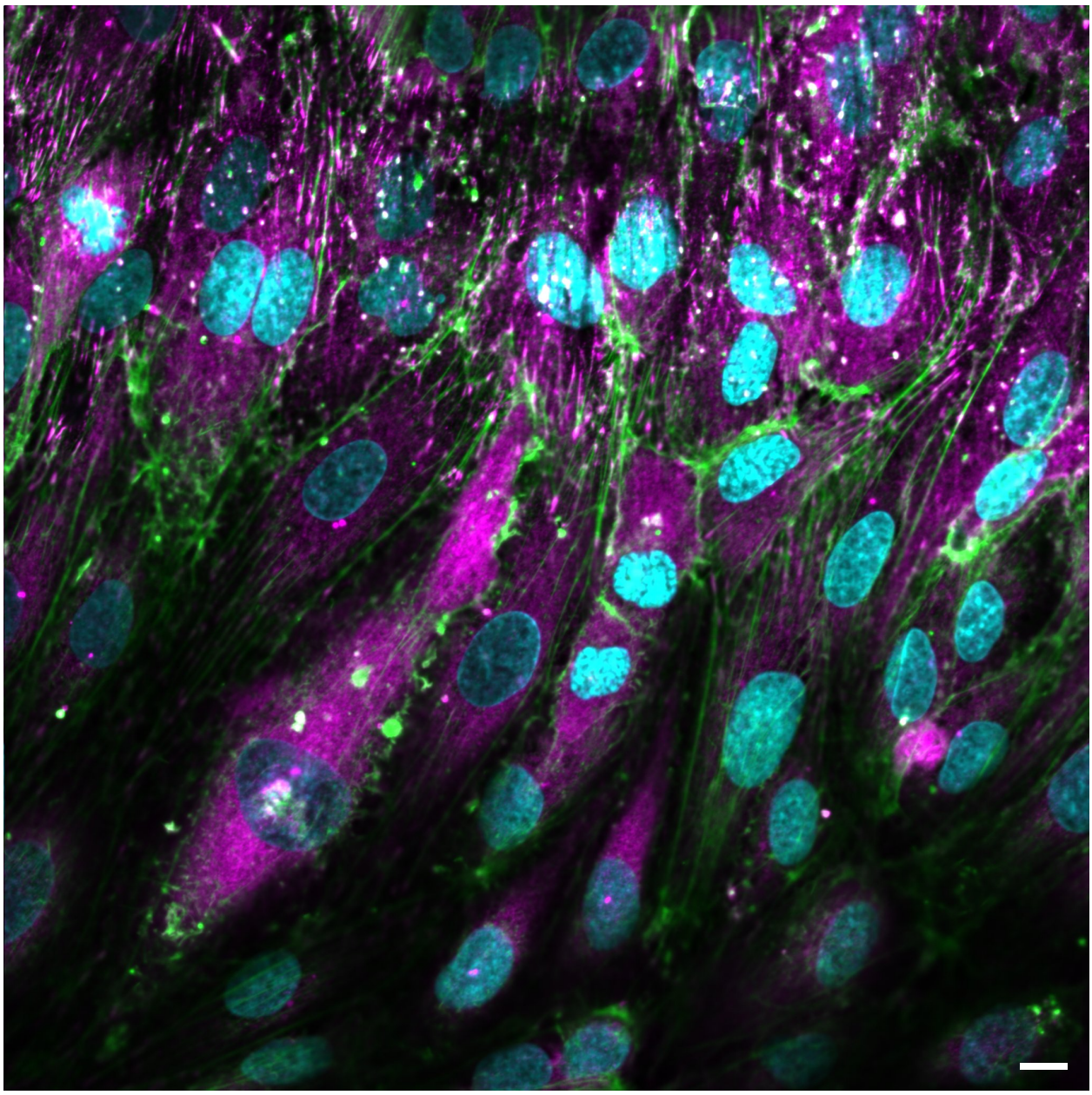

Figure S7: Micrograph of fixed cells on electrospun and cross-linked gelatin nanofibers on EM grids. Composite image shows F-actin (green), nuclei (cyan), and paxillin (magenta). A cell appears to be dividing. Scale bar, 10 μm.

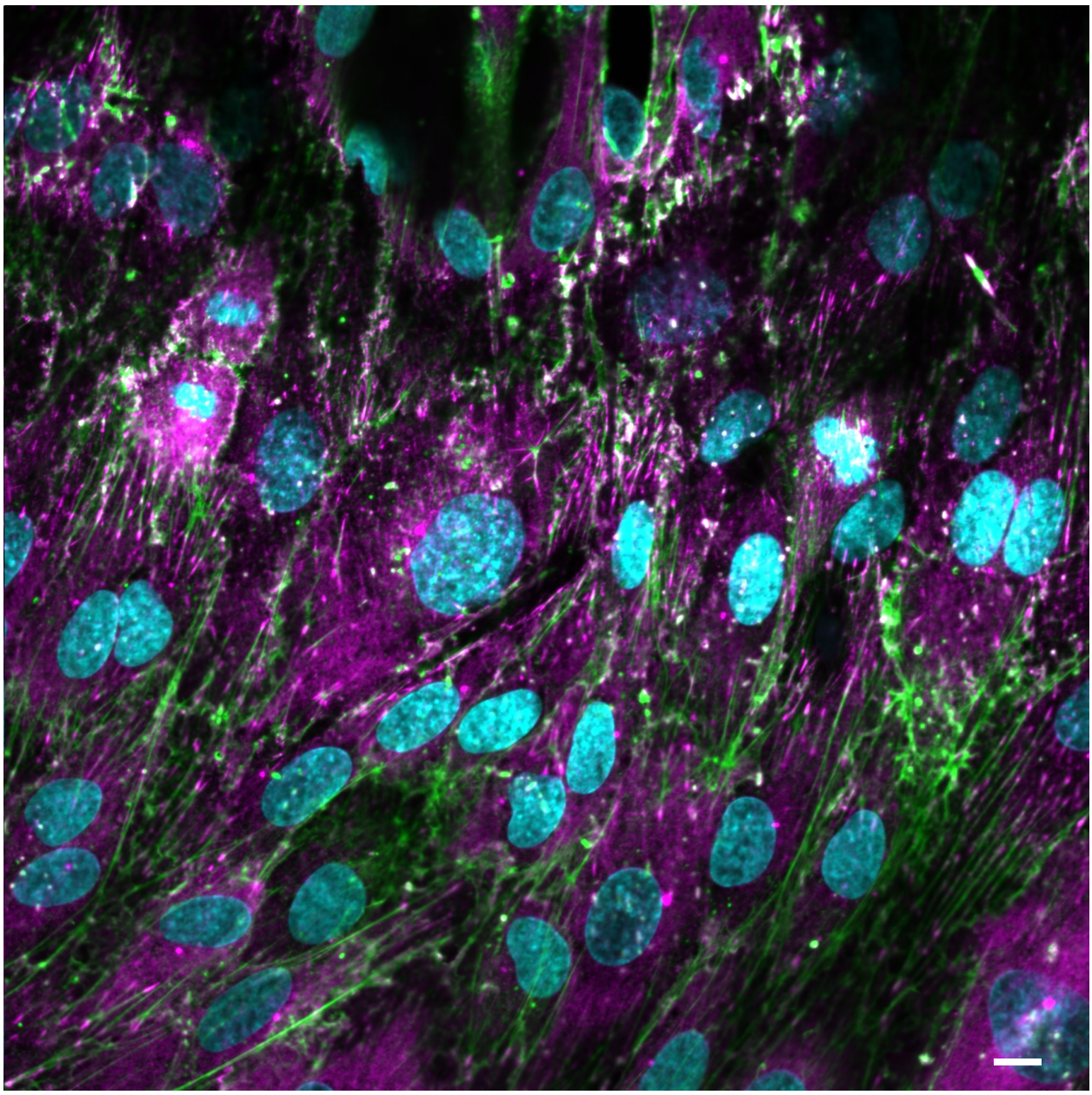

Figure S8: Micrograph of fixed cells on electrospun and cross-linked gelatin nanofibers on EM grids. Composite image shows F-actin (green), nuclei (cyan), and paxillin (magenta). A cell appears to be dividing. Scale bar, 10 μm.

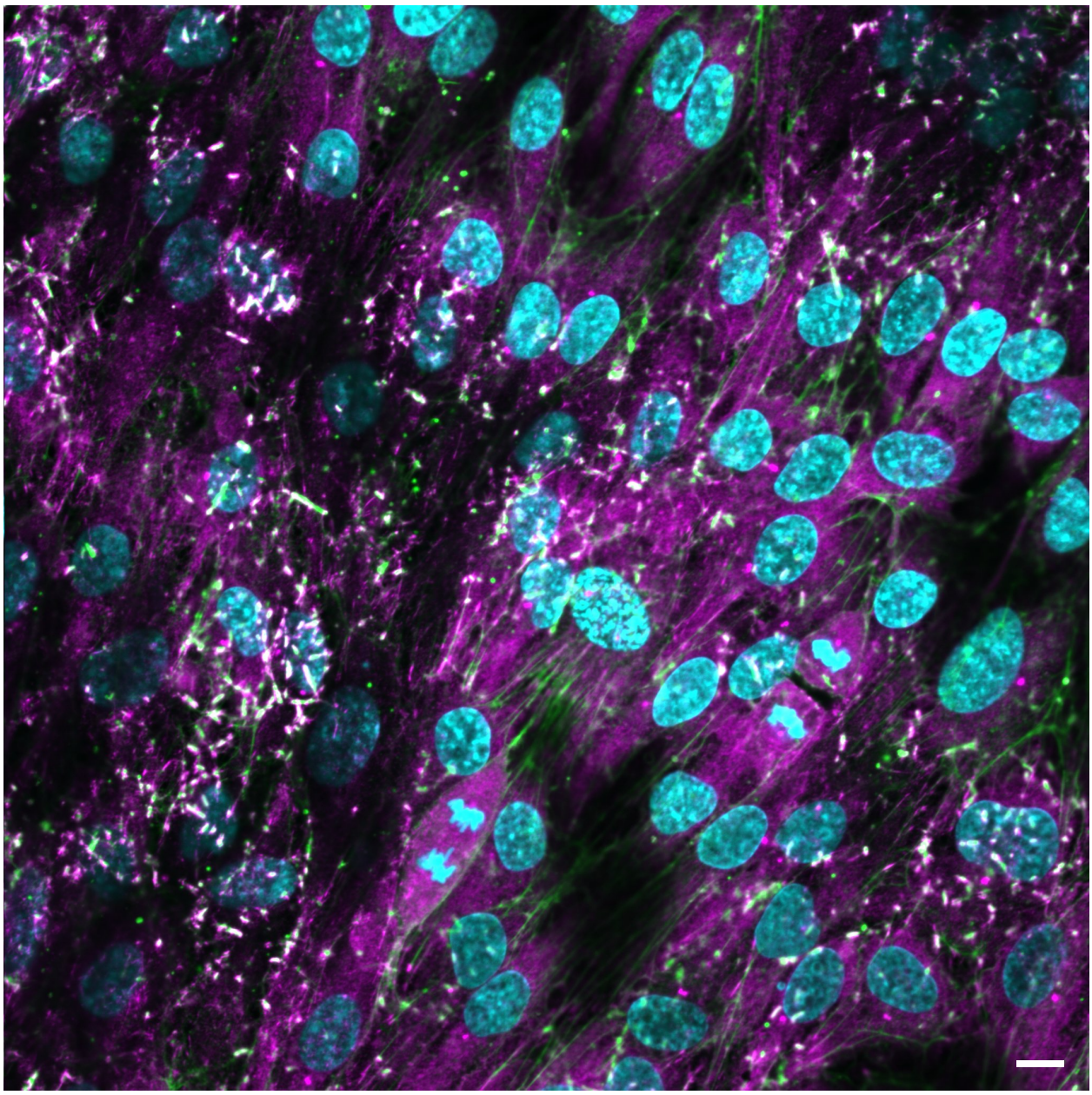

Figure S9: Micrograph of fixed cells on electrospun and cross-linked gelatin nanofibers on EM grids. Composite image shows F-actin (green), nuclei (cyan), and paxillin (magenta). Two cells appears to be dividing. Scale bar, 10 μm.

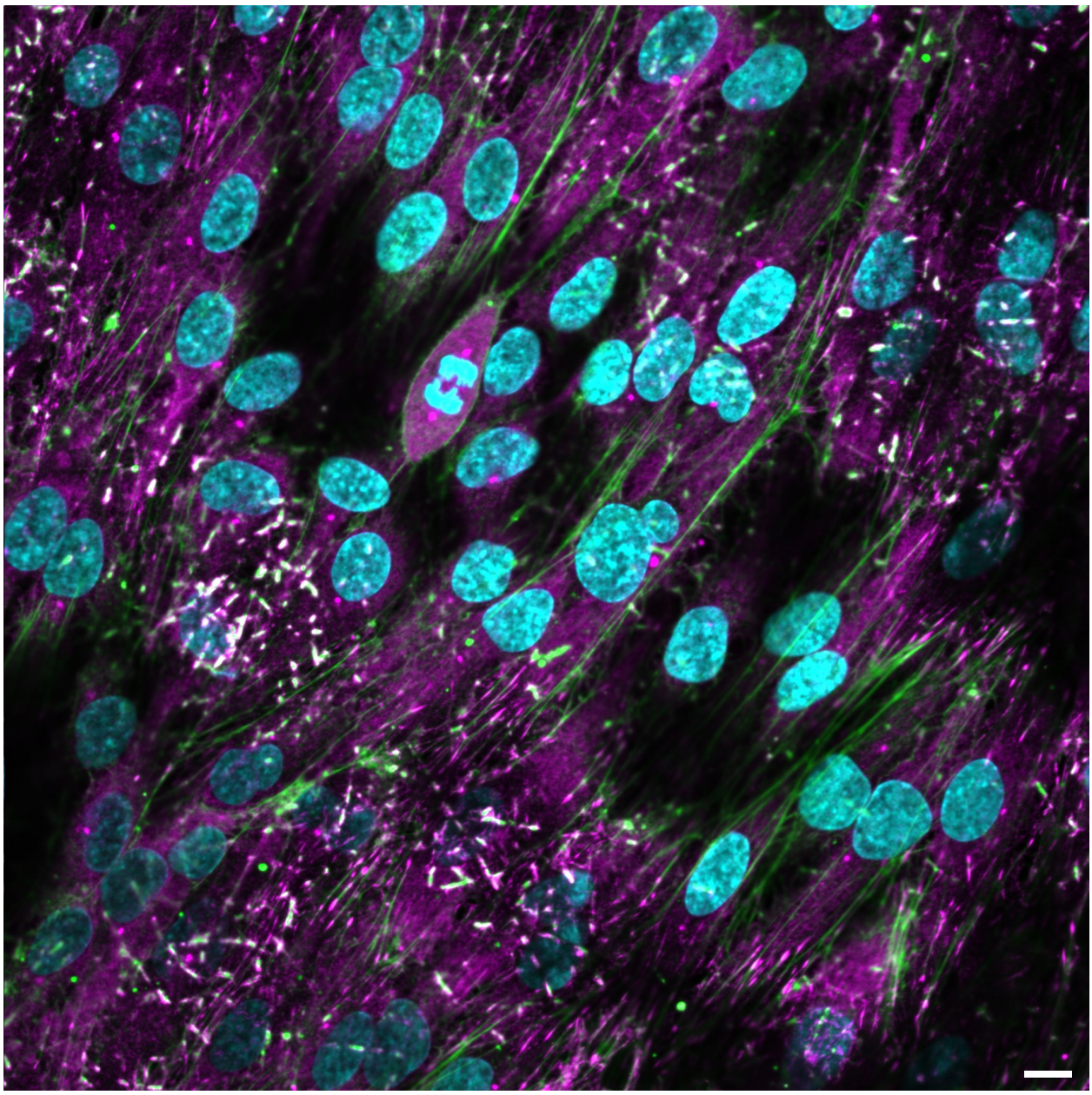

Figure S10: Micrograph of fixed cells on electrospun and cross-linked gelatin nanofibers on EM grids. Composite image shows F-actin (green), nuclei (cyan), and paxillin (magenta). A cell appears to be dividing. Scale bar, 10 μm.

Table 1: Measured fiber diameters from HRSEM images.

Aligned- exp1	Aligned- exp2	Aligned- exp3	Random- exp1	Ramdom-exp2	Random- exp 3
649.434	294.365	394.447	464.145	505.139	459.61
613.031	328.2	406.992	792.829	658.221	481.857
626.93	484.334	278.487	352.804	814.277	484.334

446.266	294.365	341.777	467.741	439.783	484.581
652.743	440.327	218.8	559.119	601.998	542.386
626.548	356.181	280.201	536.395	683.903	610.487
402.259	356.181	402.259	437.6	479.866	470.547
455.293	364.156	333.266	855.841	434.306	562.32
293.551	333.266	358.859	235.655	541.723	418.732
570.561	285.28	364.156	201.724	920.261	380.548
249.47	364.156	201.724	109.4	738.106	240.929
493.635	526.94	442.496	140.1	681.449	285.28
716.716	313.274	264.377	473.337	510.325	188.854
443.036	345.953	401.663	323.054	650.539	497.259
294.365	503.715	503.715	206.416	634.52	571.085
503.715	360.854	303.967	372.603	616.535	761.883
717.717	382.118	418.017	437.6	461.559	313.465
543.488	560.828	403.447	394.447	704.59	350.08
788.895	309.43	176.402	465.175	636.027	339.316
631.495	341.777	451.068	499.899	616.535	535.166
568.88	491.692	188.219	402.259	785.55	372.603
503.715	493.635	323.054	536.395	715.379	507.503
328.2	480.364	313.274	387.715	626.548	308.073
574.324	540.396	352.804	507.503	541.281	606.85
401.663	424.833	498.941	796.444	686.697	430.569
232.588	249.47	609.506	559.119	714.374	517.081
266.182	267.079	342.476	629.977	610.291	372.121
649.803	325.27	364.156	712.361	418.017	476.989
784.33	278.487	451.068	244.626	570.561	
560.401	356.181	285.28	207.572	1103.802	
402.259	495.088	305.146	318.895	665.454	
529.207	430.986	240.68	557.731	605.171	
387.097	249.47	284.019	203.818	297.6	
461.559	232.588	502.049	561.591	294.365	
389.562	547	612.347	439.037	683.903	
754.464	424.833	411.96	472.927		
341.777	477.866	332.727	478.516		
574.324	464.145	356.181	404.772		
376.438	280.201	449.739	455.75		
541.281	263.47	441.005	694.178		
553.957	280.201	280.414	561.591		
728.64	244.626	445.461	641.168		

529.659	418.017	300.999	628.605		
389.562	479.866	337.725	490.519		
394.447	285.28	674.121	506.846		
520.082	541.281	397.62	495.91		
643.51	529.659	388.486	168.072		
485.815	294.365	604.082	543.853		
418.017	218.8	411.233	531.491		
516.387	232.588	483.593	486.437		
622.716	465.175	323.979	461.547		
833.166	403.447	363.662	575.618		
371.96	451.068	264.829	473.278		
540.396	267.079	263.47	415.708		
667.967	652.743	406.108	490.858		
722.371	185.658	270.862	452.824		
307.1	201.724	308.849	555.641		
479.866	325.27	318.014	541.403		
550.924	267.079	365.632	518.194		
754.464	681.449	349.053	439.037		
416.43	293.551	418.017	412.831		
330.35	256.099	457.13	291.916		
568.909	855.841	505.139	510.794		
525.184	185.658	519.736	746.81		
709.788	236.668	485.568	339.669		
750.731	333.266	389.562	387.097		
502.64		256.332	495.088		
270.652		161.527	658.221		
590.189		477.616	489.252		
425.311		531.125	403.447		
347.981		358.358	520.082		
552.917		296.189	614.201		
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450.903		717.884	280.201		
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295.727		416.583	399.273		
330.35		535.166	510.794		
379.819			402.259		
574.791			489.252		

600.236			315.558		
464.78			577.649		
441.691			634.52		
492.879			661.486		
611.341			303.967		
380.802			424.833		
391.449			443.036		
528.023			403.447		
676.354			278.487		
634.633			463.629		
437.673			244.626		
113.984			646.109		
198.629			366.776		
242.08			461.559		
459.589			455.293		
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50.901			717.717		
307.109			529.659		
393.967			313.274		
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439.424			597.608		
372.497			468.252		
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137.239			559.119		
180.983			727.325		
350.651			715.379		
69.89			402.259		
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437.673			263.47		
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176.96			356.181		

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679.69			154.715		
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510.325			901.339		
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371.96			798.545		
686.697			614.201		
403.447			461.559		
313.274			309.43		
360.854			371.96		
510.794			303.967		
309.43			284.44		
241.672			372.603		
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532.813			371.96		
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353.482			643.51		
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285.28			266.182		
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