

<sup>1</sup> Animal #	<sup>2</sup> CSLT MPD C/EG/Diff (µm)	<sup>3</sup> BMOD-BM C/EG/Diff (µm)	<sup>4</sup> ALCSD-BM C/EG/Diff (µm)	<sup>5</sup> ALCSD-BMO C/EG/Diff (µm)	<sup>6</sup> PLTT C/EG/Diff (µm)	<sup>7</sup> MRW C/EG/Diff (µm)	<sup>8</sup> RNFLT C/EG/Diff (µm)
1	16.3/-55.3/-71.6	11.6/0.6/-11.0	-5.9/-16.0/-10.1	-17.7/-15.4/2.3	-7.9/-102.0/-94.1	-8.4/-48.6/-40.2	-3.4/-10.8/-7.4
2	-20.6/-43.6/-23.0	-3.5/-22.5/-19.0	1.3/-124.2/-125.5	3.3/-94.3/-97.6	28.0/--/--	8.6/-47.2/-55.8	-3.7/--/--
3	-9.6/-62.7/-53.1	0.8/-11.0/-11.8	-1.7/-62.5/-60.8	-2.7/-51.0/-48.3	-1.9/-28.8/-26.9	-6.9/-24.1/-17.2	-11.0/-16.2/-5.2
4	-29.3/-70.1/-40.8	7.3/-17.5/-24.8	2.2/-54.3/-56.5	-6.0/-37.3/-31.3	-0.6/-23.8/-23.2	-15.4/-52.5/-37.5	4.8/1.3/-3.5
5	10.4/-31.6/-42.0	-11.1/-12.4/-1.3	-30.6/-76.4/-45.8	-19.5/-64.1/-44.6	1.0/-5.4/-6.4	-13.2/-27.8/-14.6	-9.2/-6.8/2.4
6	-5.9/-61.7/-55.8	-5.6/-26.8/-21.2	-18.3/-72.9/-54.6	-11.5/-46.2/-34.7	1.7/-66.6/-68.3	-9.0/-80.2/-71.2	-1.1/-29.4/-28.3
7	-4.5/-35.5/-31.0	3.3/-17.2/-20.5	-4.4/-89.2/-84.8	-7.3/-71.2/-63.9	-51.5/-46.7/4.8	-30.2/-75.6/-45.4	-8.4/-32.8/-24.4
8	-8.9/-53.3/-44.4	10.5/-16.1/-26.6	77.2/0.3/-76.9	68.4/16.7/-51.7	-77.3/-68.1/9.2	-1.4/-38.6/-37.2	10.7/-3.8/-14.5
9	8.3/-37.7/-46.0	14.0/-8.0/-22.0	56.9/-9.5/-66.4	44.8/-1.4/-46.2	-5.7/-8.4/-2.7	3.8/-17.4/-21.2	-0.9/-8.1/-7.2
10	-4.7/-62.6/-57.9	11.5/3.7/-7.8	34.2/-158.6/-192.8	22.6/-161.0/-183.6	2.4/28.7/26.3	5.4/-67.9/-73.3	-1.1/-26.7/-25.6
11	8.5/-178.5/-187.0	-2.0/-96.8/-94.8	-20.3/-271.6/-251.3	-16.3/-173.3/-157.0	13.5/-109.5/-123.0	-4.0/-153.7/-149.7	-4.7/-53.8/-49.1
12	0.3/-31.8/-32.1	1.8/-6.4/-8.2	-44.0/-127.4/-83.4	-47.6/-120.3/-72.7	46.8/4.6/-42.2	4.3/-52.3/-56.6	8.8/10.6/1.8
13	0.8/-151.7/-152.5	-17.1/-75.5/-58.4	-36.3/-311.6/-275.3	-19.3/-236.3/-217.0	-8.4/-49.9/-41.5	-11.3/-134.4/-123.1	-4.5/0.1/4.6
14	-16.7/-282.9/-266.2	-10.0/-56.5/-46.5	9.7/-360.7/-370.4	20.4/-303.9/-324.3	-40.8/-188.6/-147.8	-3.6/-186.2/-182.6	-2.5/--/--
15	-3.1/-404.4/-401.3	5.8/-87.5/-93.3	25.8/-243.9/-269.7	17.9/-142.1/-160.0	-133.1/-216.3/-83.2	-109.6/-184.4/-74.8	-15.8/-53.0/-37.2

774

775

<sup>1</sup>Animals order (1 – 15) was determined by the magnitude of EG vs. control eye *Acute Compliance* difference in *ALCSD-BM* (Supplemental Table 2).

776

<sup>2</sup>Mean Position of the Disc (MPD) change from baseline at confocal scanning laser tomography (CSLT) onset.

777

778

<sup>3</sup>*BMOD-BM* – BMO depth relative to the peripheral Bruch's Membrane (BM) reference plane 1500 µm from the Bruch's Membrane Opening (BMO) centroid. Negative effect size for *BMOD-BM* indicates posterior deformation; positive effect size for *BMOD-BM* indicates anterior deformation.

779

780

<sup>4</sup>*ALCSD-BM* – Anterior lamina cribrosa surface depth (ALCSD) relative to the BM reference plane. Negative effect size for *ALCSD-BM* indicates posterior deformation; positive effect size for *ALCSD-BM* indicates anterior deformation.

781

782

<sup>5</sup>*ALCSD-BMO* – Anterior lamina cribrosa surface depth (ALCSD) relative to the BMO reference plane. Negative effect size for *ALCSD-BMO* indicates posterior deformation; positive effect size for *ALCSD-BMO* indicates anterior deformation.

783

<sup>6</sup>*PLTT* – Prelaminar Tissue Thickness.

784

<sup>7</sup>*MRW* – Minimum Rim Width.

785

<sup>8</sup>*RNFLT* – Retinal nerve fiber layer thickness 1200 µm from the BMO centroid.

786

'--' – Parameter could not be measured due to poor image quality at time of imaging.

787

**Supplemental Table 1. Fixed Deformation at CSLT-detected Experimental Glaucoma (EG) Onset.**

<sup>1</sup> Animal #	<sup>2</sup> <i>BMOD-BM</i> C/EG/Diff (µm)	<sup>3</sup> <i>ALCSD-BM</i> C/EG/Diff (µm)	<sup>4</sup> <i>ALCSD-BMO</i> C/EG/Diff (µm)	<sup>5</sup> <i>PLTT</i> C/EG/Diff (µm)	<sup>6</sup> <i>MRW</i> C/EG/Diff (µm)	<sup>7</sup> <i>RNFLT</i> C/EG/Diff (µm)
1	-8.2/- <b>6.5</b> /1.7	-19.2/ <b>6.1</b> /25.3	-8.0/14.9/22.9	-41.5/-47.5/-6.0	-17.7/-16.7/1.0	-1.6/-3.0/-1.4
2	-10.2/-13.7/-3.5	-17.0/- <b>0.2</b> /16.8	-5.4/6.7/12.1	-6.1/--/--	-10.1/ <b>7.4</b> /17.5	1.8/--/--
3	-30.3/-30.5/-0.2	-34.9/-27.4/7.5	-3.3/4.4/7.7	-22.1/-32.0/-9.9	-11.6/-20.3/-8.7	-2.6/ <b>6.0</b> /8.6
4	-37.6/-38.9/-1.3	-21.7/-23.4/-1.7	15.1/14.6/-0.5	-33.2/-23.8/9.4	-23.7/-25.7/-2.0	-3.5/-2.4/1.1
5	-39.3/-34.1/5.2	-43.3/-49.8/-6.5	-4.1/-15.7/-11.6	-46.2/-28.5/17.7	-27.7/-23.9/3.8	-5.0/-3.4/1.6
6	-34.0/-50.4/-16.4	-32.9/-72.6/-39.7	0.8/-22.2/-23.0	-25.4/-17.3/8.1	-13.1/-10.0/3.1	-3.3/-3.6/-0.3
7	-21.6/-27.0/-5.4	-42.2/-83.7/-41.5	-20.2/- <b>56.3</b> /-36.1	11.7/-26.8/-38.5	-11.8/-21.7/-9.9	-1.7/-0.3/1.4
8	-59.0/- <b>82.0</b> /-23.0	-90.1/- <b>140.5</b> /-50.4	-32.4/- <b>58.6</b> /-26.2	-38.0/-53.9/-15.9	-27.9/- <b>39.1</b> /-11.2	-10.5/-3.7/6.8
9	-41.4/- <b>61.4</b> /-20.0	-44.1/- <b>106.3</b> /-62.2	-2.7/- <b>45.4</b> /-42.7	-28.5/-28.3/0.2	-18.9/-29.0/-10.1	-0.2/0.0/0.2
10	-26.6/-51.9/-25.3	-44.3/- <b>121.4</b> /-77.1	-17.2/- <b>69.9</b> /-87.1	-16.0/- <b>70.5</b> /-54.5	-8.5/- <b>30.8</b> /-22.3	-3.9/-6.0/-2.1
11	-25.4/-11.6/13.8	-29.9/- <b>118.5</b> /-88.6	-5.5/- <b>107.0</b> /-101.5	-24.0/5.1/29.1	-17.6/- <b>4.3</b> /13.3	-2.3/--/--
12	-34.3/-41.6/-7.3	-26.9/- <b>118.0</b> /-91.1	7.1/- <b>75.8</b> /-82.9	-54.0/-33.5/20.5	-29.0/-17.4/11.6	-7.8/ <b>4.7</b> /12.5
13	-32.6/- <b>76.3</b> /-43.7	-32.1/- <b>132.7</b> /-100.6	0.6/- <b>56.5</b> /-57.1	-14.8/- <b>67.1</b> /-52.3	-9.3/-27.6/-18.3	-4.9/-7.8/-2.9
14	-47.4/- <b>83.4</b> /-36.0	-78.3/- <b>182.6</b> /-104.3	-30.8/- <b>99.8</b> /-69.0	9.1/-19.9/-29.0	-21.7/-25.4/-3.7	-1.0/--/--
15	-52.4/- <b>97.2</b> /-44.8	-68.6/- <b>206.2</b> /-137.6	-16.6/- <b>123.3</b> /-106.7	-27.2/-42.9/-15.7	-17.5/- <b>39.0</b> /-21.5	1.7/--/--
<sup>8</sup> Control Eye Range	[-8.2, -59.0]	[-17.0, -90.1]	[15.1, -32.4]	[11.7, -54.0]	[-8.5, -29.0]	[1.8, -10.5]

788

789

<sup>1</sup>Animals ordered by the magnitude of *Acute Compliance* difference in *ALCSD-BM* between control and EG eyes.

790

791

792

<sup>2</sup>*BMOD-BM* – Bruch's Membrane Opening (BMO) depth relative to the peripheral Bruch's Membrane (BM) reference plane 1500 µm from the BMO centroid. Negative effect size for *BMOD-BM* indicates posterior deformation; positive effect size for *BMOD-BM* indicates anterior deformation.

793

794

<sup>3</sup>*ALCSD-BM* – Anterior lamina cribrosa surface depth (ALCSD) relative to the BM reference plane. Negative effect size for *ALCSD-BM* indicates posterior deformation; positive effect size for *ALCSD-BM* indicates anterior deformation.

795

796

<sup>4</sup>*ALCSD-BMO* – Anterior lamina cribrosa surface depth (ALCSD) relative to the BMO reference plane. Negative effect size for *ALCSD-BMO* indicates posterior deformation; positive effect size for *ALCSD-BMO* indicates anterior deformation.

797

<sup>5</sup>*PLTT* – Prelaminar tissue thickness.

798

<sup>6</sup>*MRW* – Minimum rim width.

799

<sup>7</sup>*RNFLT* – Retinal nerve fiber layer thickness 1200 µm from the BMO centroid.

800

<sup>8</sup>Control Eye Range – minimum and maximum *Acute Compliance* for each parameter across control eyes.

801

802

803

804

805

806

**EG Eye Bold Values** – EG eye *Acute Compliance* values which are outside of the control eye range for a given parameter (see above) are **Bold**. EG eyes demonstrating parameter values that are less **negative than** the control eye range are interpreted to represent a decrease in compliance. EG eyes demonstrating parameter values that are **more negative than** the control eye range are interpreted to represent an increase in compliance or "hypercompliance". Neural tissue swelling or a change in **the direction of acute** connective tissue **deformation** from posterior (**outward or negative**) to anterior (**inward or positive**) can confound these definitions **and should be interpreted with caution** (*ALCSD-BM* for Animal 1; *MRW* for Animal 2; and *RNFLT* for Animal 12).

807

'--' – Parameter could not be measured due to poor image quality at time of imaging.

808

809

**Supplemental Table 2. Acute Compliance at Confocal Scanning Laser Tomography (CSLT)-detected Experimental Glaucoma (EG) Onset.**

810

811

812