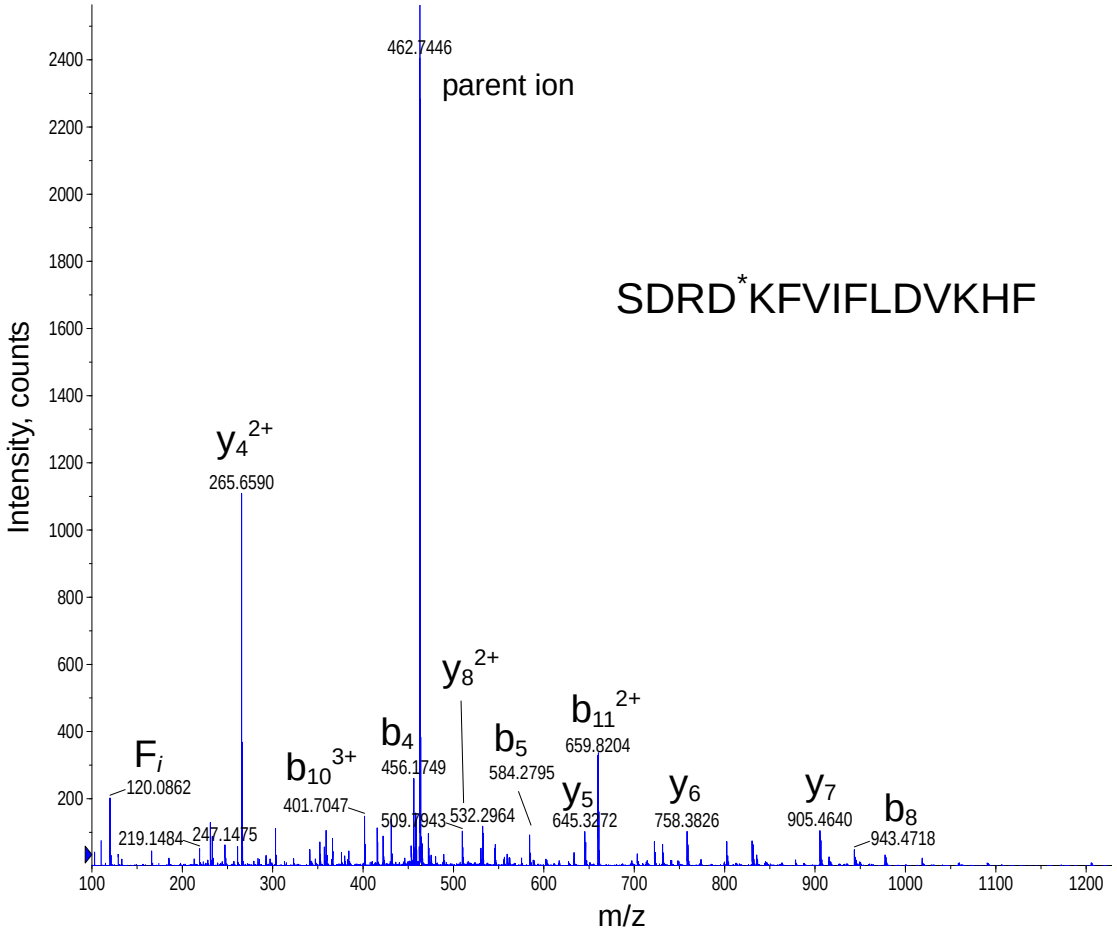


**Figure S1:** The ESI-MS/MS spectra of the $\alpha A_{66\text{-}80}$-$H_2O$ (SDRD*KFVIFLDVKHF) peptide, peak ion *m/z*1847.98 (from *m/z*462.74$^{4+}$), from analysis of the CWI-US extract of the 65 year old lens. The major *b* and *y* ions are labeled on the spectra. See Table S1 for the complete list of matching ions.

* Peptide has a loss of $H_2O$ at the D69 residue.

**Table S1:** The expected *b* and *y* ions of the $\alpha A_{66\text{-}80}$-$H_2O$ (SDRD*KFVIFLDVKHF) peptide, peak ion *m/z*1847.98 (from *m/z*462.74$^{4+}$). The matching ions observed from the ESI-MS/MS spectra (Fig. S1) are indicated in bold text (high-lighted cells).

| # | b | $b^{2+}$ | $b^{3+}$ | Seq. | y | $y^{2+}$ | $y^{3+}$ | # |
|---|---|---|---|---|---|---|---|---|
| **1** | 88.04 | 44.02 | 30.01 | **S** | | | | **15** |
| **2** | 203.07 | 101.53 | 68.36 | **D** | 1760.95 | 880.47 | **587.65** | **14** |
| **3** | **359.17** | 179.58 | 120.39 | **R** | 1645.92 | 822.96 | 549.31 | **13** |
| **4** | **456.18** | 228.09 | 152.73 | **D** | 1489.82 | 744.91 | 497.27 | **12** |
| **5** | **584.28** | **292.14** | 195.43 | **K** | 1392.80 | 696.40 | 464.93 | **11** |
| **6** | **731.35** | **365.67** | 244.45 | **F** | 1264.71 | 632.35 | 422.24 | **10** |
| **7** | **830.42** | **415.21** | 277.47 | **V** | 1117.64 | **558.82** | 373.21 | **9** |
| **8** | **943.50** | **471.75** | 315.17 | **I** | 1018.57 | **509.29** | 340.19 | **8** |
| **9** | 1090.57 | **545.28** | **364.19** | **F** | **905.49** | **452.74** | 302.50 | **7** |
| **10** | 1203.65 | **601.83** | **401.88** | **L** | **758.42** | 379.21 | 253.47 | **6** |
| **11** | 1318.68 | **659.34** | 440.23 | **D** | **645.34** | **322.67** | 215.78 | **5** |
| **12** | 1417.75 | 708.87 | **473.25** | **V** | **530.31** | **265.15** | 177.44 | **4** |
| **13** | 1545.84 | 772.92 | 515.95 | **K** | **431.24** | 215.62 | 144.41 | **3** |
| **14** | 1682.90 | 841.45 | **561.63** | **H** | **303.15** | 151.57 | 101.72 | **2** |
| **15** | | | | **F** | **166.09** | 83.04 | 56.03 | **1** |

* Peptide has a loss of $H_2O$ at the D69 residue.

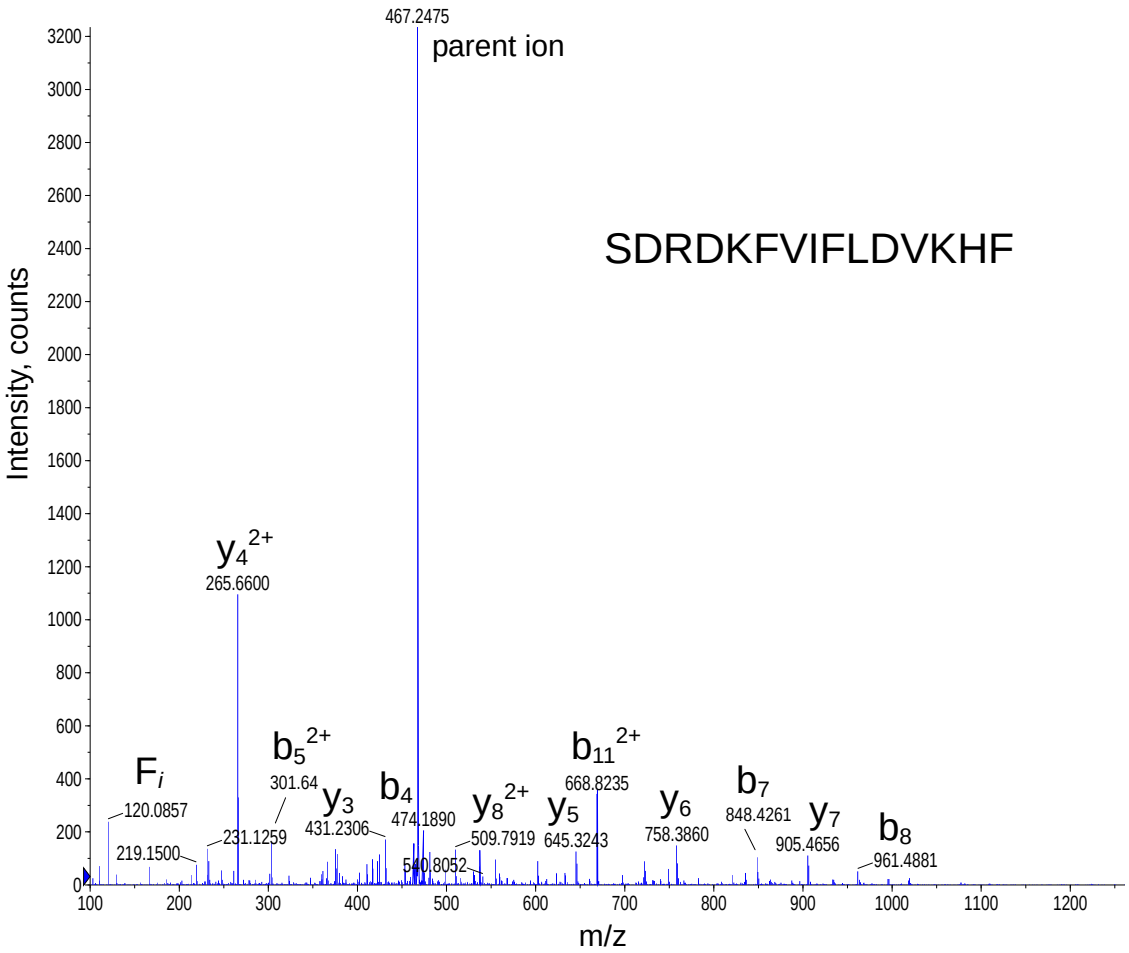


**Figure S2:** The ESI-MS/MS spectra of the $\alpha A_{66\text{-}80}$ (SDRDKFVIFLDVKHF) peptide, peak ion *m/z*1866.01 (from *m/z*467.25$^{4+}$), from analysis of the CWI-US extract of the 65 year old lens. The major *b* and *y* ions are labeled on the spectra. See Table S2 for the complete list of matching ions.

**Table S2:** The expected *b* and *y* ions of the $\alpha A_{66\text{-}80}$ (SDRDKFVIFLDVKHF) peptide, peak ion 1866.01 (from *m/z*467.25$^{4+}$). The matching ions observed from the ESI-MS/MS spectra (Fig. S2) are indicated in bold text (high-lighted cells).

| # | b | $b^{2+}$ | $b^{3+}$ | Seq. | y | $y^{2+}$ | $y^{3+}$ | # |
|---|---|---|---|---|---|---|---|---|
| **1** | 88.04 | 44.02 | 30.01 | **S** | | | | **15** |
| **2** | 203.07 | 101.53 | 68.36 | **D** | 1778.96 | 889.98 | **593.65** | **14** |
| **3** | **359.17** | 179.58 | 120.39 | **R** | 1663.93 | 832.47 | **555.31** | **13** |
| **4** | **474.19** | 237.60 | 158.73 | **D** | 1507.83 | 754.42 | 503.28 | **12** |
| **5** | **602.29** | **301.65** | 201.43 | **K** | 1392.80 | **696.91** | 464.93 | **11** |
| **6** | **749.36** | **375.18** | 250.45 | **F** | 1264.71 | **632.86** | 422.24 | **10** |
| **7** | **848.43** | **424.72** | 283.48 | **V** | 1117.64 | **559.32** | 373.21 | **9** |
| **8** | **961.51** | **481.26** | 321.17 | **I** | **1018.57** | **509.79** | 340.19 | **8** |
| **9** | 1108.58 | **554.79** | 370.19 | **F** | **905.49** | **453.25** | 302.50 | **7** |
| **10** | 1221.66 | 611.34 | **407.89** | **L** | **758.42** | **379.71** | 253.47 | **6** |
| **11** | 1336.69 | **668.85** | 446.23 | **D** | **645.34** | **323.17** | 215.78 | **5** |
| **12** | 1435.76 | 718.38 | 479.25 | **V** | **530.31** | **265.66** | 177.44 | **4** |
| **13** | 1563.85 | **782.43** | 521.95 | **K** | **431.24** | 216.12 | 144.41 | **3** |
| **14** | 1700.91 | 850.96 | **567.64** | **H** | **303.15** | 152.08 | 101.72 | **2** |
| **15** | | | | **F** | 166.09 | 83.55 | 56.03 | **1** |

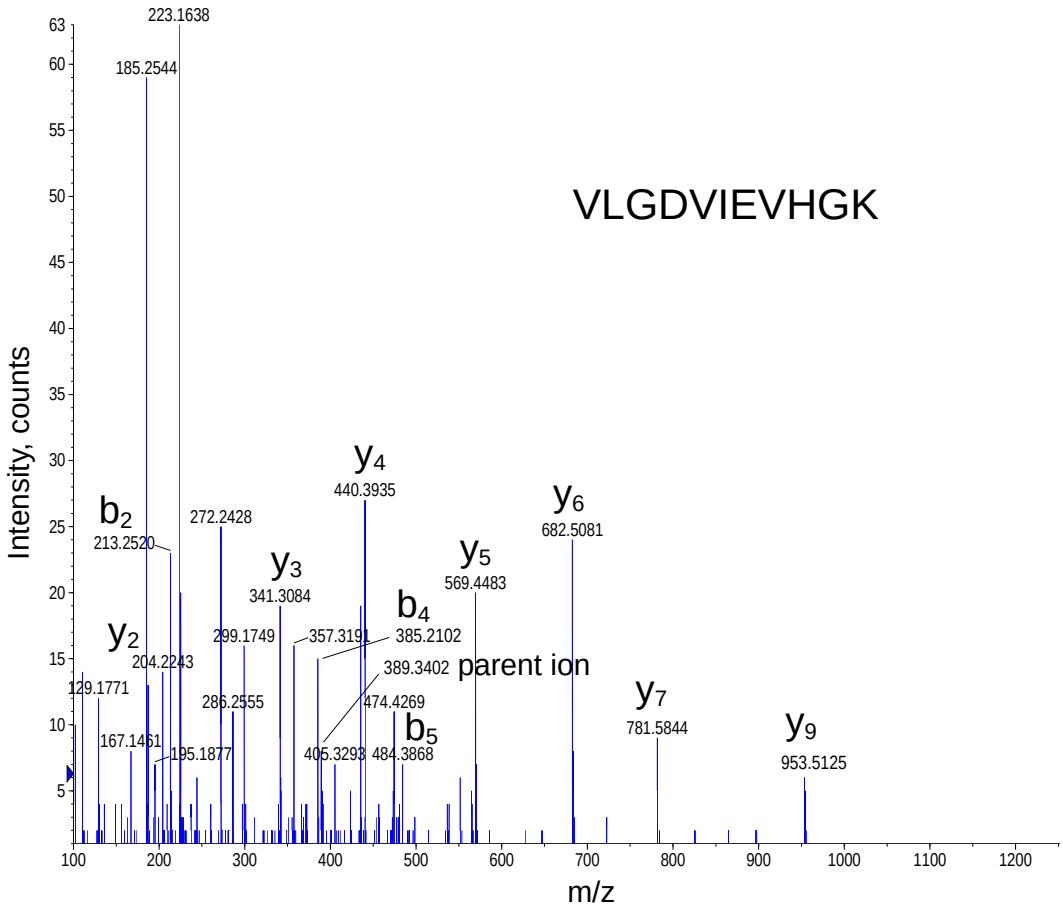


**Figure S3:** The ESI-MS/MS spectra of the $\alpha B_{93\text{-}103}$ (VLGDVIEVHGK) peptide, peak ion *m/z*1166.02 (from *m/z*389.34$^{3+}$), from analysis of the CWS extract of the 65 year old lens. The major *b* and *y* ions are labeled on the spectra. See Table S3 for the complete list of matching ions.

**Table S3:** The expected *b* and *y* ions of the $\alpha B_{93\text{-}103}$ (VLGDVIEVHGK) peptide, peak ion *m/z*1166.02 (from *m/z*389.34$^{3+}$). The matching ions observed from the ESI-MS/MS spectra (Fig. S3) are indicated in bold text and (high-lighted cells).

| # | b | $b^{2+}$ | $b^{3+}$ | Seq. | y | $y^{2+}$ | $y^{3+}$ | # |
|---|---|---|---|---|---|---|---|---|
| **1** | 100.08 | 50.54 | 34.03 | **V** | | | | **11** |
| **2** | **213.16** | 107.08 | 71.72 | **L** | 1066.59 | 533.80 | 356.20 | **10** |
| **3** | 270.18 | 135.59 | 90.73 | **G** | **953.51** | 477.26 | 318.50 | **9** |
| **4** | **385.21** | 193.11 | 129.07 | **D** | **896.48** | 448.75 | 299.49 | **8** |
| **5** | **484.28** | 242.64 | 162.09 | **V** | **781.46** | 391.23 | 261.15 | **7** |
| **6** | 597.36 | 299.18 | 199.79 | **I** | **682.39** | 341.70 | 228.13 | **6** |
| **7** | 726.40 | 363.71 | 242.80 | **E** | **569.30** | 285.16 | 190.43 | **5** |
| **8** | 825.47 | 413.24 | 275.82 | **V** | **440.26** | 220.63 | 147.42 | **4** |
| **9** | 962.53 | 481.77 | 321.51 | **H** | **341.19** | 171.10 | 114.40 | **3** |
| **10** | 1019.55 | 510.28 | 340.52 | **G** | **204.13** | 102.57 | 68.71 | **2** |
| **11** | | | | **K** | 147.11 | 74.06 | 49.70 | **1** |

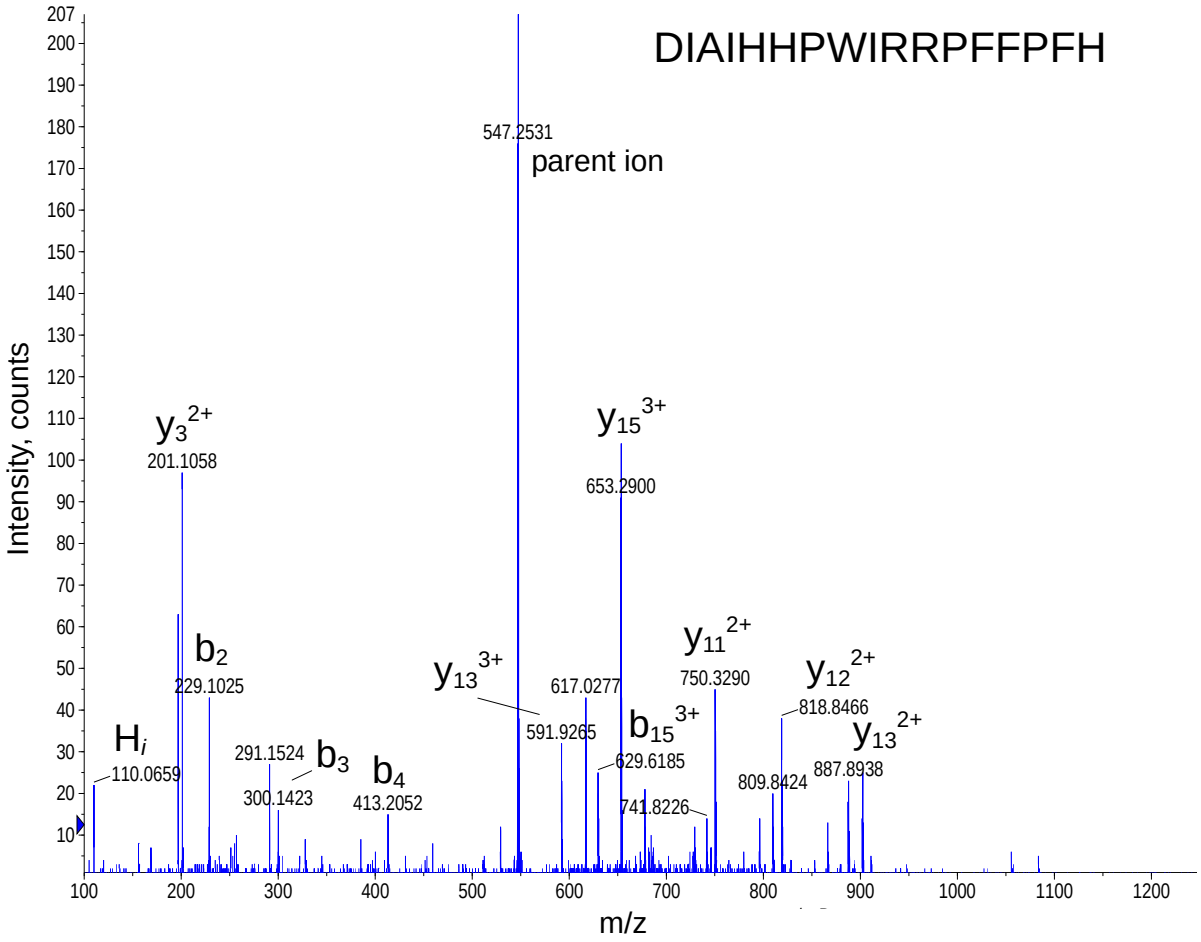


**Figure S4:** The ESI-MS/MS spectra of the $\alpha B_{2\text{-}18}$ (DIAIHHPWIRRPFFPFH) peptide, peak ion *m/z*2186.01 (from *m/z*547.25$^{4+}$), from analysis of the NWI-US extract of the 65 year old lens. The major *b* and *y* ions are labeled on the spectra. See Table S4 for the complete list of matching ions.

**Table S4:** The expected *b* and *y* ions of the $\alpha B_{2\text{-}18}$ (DIAIHHPWIRRPFFPFH) peptide, peak ion *m/z*2186.01 (from *m/z*547.25$^{4+}$). The matching ions observed from the ESI-MS/MS spectra (Fig. S4) are indicated in bold text (high-lighted cells).

| # | b | $b^{2+}$ | $b^{3+}$ | Seq. | y | $y^{2+}$ | $y^{3+}$ | # |
|---|---|---|---|---|---|---|---|---|
| **1** | 116.03 | 58.52 | 39.34 | **D** | | | | **17** |
| **2** | **229.12** | 115.06 | 77.04 | **I** | 2071.13 | 1036.07 | 691.04 | **16** |
| **3** | **300.16** | 150.58 | 100.72 | **A** | 1958.04 | 979.53 | **653.35** | **15** |
| **4** | **413.24** | 207.12 | 138.41 | **I** | 1887.01 | 944.01 | 629.67 | **14** |
| **5** | **550.30** | 275.65 | 184.10 | **H** | 1773.92 | **887.47** | **591.97** | **13** |
| **6** | 687.36 | **344.18** | 229.79 | **H** | 1636.86 | **818.94** | 546.29 | **12** |
| **7** | 784.41 | **392.71** | 262.14 | **P** | 1499.81 | **750.41** | 500.60 | **11** |
| **8** | 970.49 | **485.75** | 324.16 | **W** | 1402.75 | 701.88 | 468.25 | **10** |
| **9** | **1083.57** | 542.29 | 361.86 | **I** | 1216.67 | 608.84 | 406.22 | **9** |
| **10** | 1239.67 | 620.34 | **413.89** | **R** | 1103.59 | 552.30 | 368.53 | **8** |
| **11** | 1395.78 | 698.39 | 465.93 | **R** | 947.49 | 474.25 | 316.50 | **7** |
| **12** | 1492.83 | 746.92 | 498.28 | **P** | 791.39 | 396.20 | 264.46 | **6** |
| **13** | 1639.90 | 820.45 | 547.30 | **F** | 694.33 | 347.67 | 232.11 | **5** |
| **14** | 1786.97 | 893.99 | 596.32 | **F** | 547.27 | **274.14** | 183.09 | **4** |
| **15** | 1884.02 | 942.51 | **628.67** | **P** | **400.20** | **200.60** | 134.07 | **3** |
| **16** | 2031.09 | 1016.05 | **677.70** | **F** | **303.15** | 152.08 | 101.72 | **2** |
| **17** | | | | **H** | **156.08** | 78.54 | 52.69 | **1** |