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| **Supplemental Table 1. CCL22 Levels by Case/Control Status Stratified by Grade/Histology, UCSF Adult Glioma Study, 1997-2012** |
|  |  |  |  |  |  |  |  |
| Case/Control Status | Grade | Histology | # | % IDH+ | CCL22 Mean (ng/mL) | CCL22 Median (ng/mL) | P-value comparing case group CCL22 mean to controls\* |
| Cases | 4 | GBM | 681 | 7% | 1.09 | 0.92 | **<0.001** |
| 3 | Astrocytoma | 138 | 51% | 1.23 | 1.14 | **<0.001** |
| 3 | Oligo/MOA | 48 | 85% | 1.51 | 1.18 | 0.57 |
| 2 | Astrocytoma | 108 | 75% | 1.56 | 1.32 | 0.75 |
| 2 | Oligo/MOA | 117 | 94% | 1.44 | 1.26 | 0.09 |
| Controls | NA | NA | 976 | NA | 1.60 | 1.40 | NA |
| \*Note: For case/case comparisons, we found a significant difference in CCL22 means between GBM and non-GBM cases (p<0.001). |
| When comparing the CCL22 means for only the non-GBM histologies, the p-value for a difference in means was 0.12. |

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| **Supplemental Table 2. Association of Demographic and Other Factors with CCL22 Levels,** |  |
| **UCSF Adult Glioma Study, 1997-2012** |  |  |  |  |
| Variable | Outcome | # | Mean LnCCL22 | T-test p-value |
| Gender (Cases and Controls) | Female | 963 | 0.22 |  |
|   | Male | 1221 | 0.11 | **p<0.0001** |
| Race (Cases and Controls) | Non-White | 442 | 0.19 |   |
|   | White | 1742 | 0.15 | 0.16 |
| Age Category (Cases Only) | <=30 | 136 | 0.24 |   |
|   | 31-40 | 177 | 0.14 |   |
|   | 41-50 | 282 | 0.02 |   |
|   | 51-60 | 288 | -0.05 |   |
|   | 61-70 | 232 | -0.13 |   |
|   | 70+ | 93 | -0.10 | **p<0.0001\*** |
| Age Category (Controls Only) | <=30 | 67 | 0.38 |   |
|   | 31-40 | 118 | 0.32 |   |
|   | 41-50 | 187 | 0.36 |   |
|   | 51-60 | 239 | 0.32 |   |
|   | 61-70 | 181 | 0.39 |   |
|   | 70+ | 184 | 0.32 | p=0.95 |
| Smoking History (Cases and Controls) | Never  | 1147 | 0.12 |  |
|   | Ever | 1029 | 0.20 | **0.005** |
| Ln=natural log |  |  |  |  |

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| **Supplemental Table 3. Demographic and Treatment-Related Variables Stratified by Study Series, TMZ use, and Histology,**  |  |
| **UCSF Adult Glioma Study, 1997-2012** |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|   |   |   |   | Temodar given 1st course | Radiation given 1st course | Dexamethasone at blood draw | Median Days Between |
| Category | Group | Median Age | 75% Survival\* | Yes | No | Yes | No | Yes | No | Dx and Blood Draw |
| Study Series | 1997-2000 Series | 53 | 295 | 4% | 96% | 89% | 11% | 39% | 61% | 109 |
|   | 2001-2005 Series | 50 | 360 | 70% | 30% | 81% | 19% | 44% | 56% | 74 |
|   | 2006-2010 Series | 51 | 504 | 80% | 20% | 77% | 23% | 27% | 73% | 104 |
|   | 2009-2012 Series | 49 | 475 | 83% | 17% | 74% | 26% | 26% | 74% | 94 |
| Histology | Non-GBM | 42 | 1380 | 55% | 45% | 54% | 46% | 22% | 78% | 104 |
|   | GBM | 57 | 322 | 85% | 15% | 98% | 2% | 44% | 56% | 91 |
| \* Since median survival was not always available due to the high % of censored observations, the cutoff where 75% of the cases were still alive was used instead of the median.   |   |
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| **Supplementary Table 4a. Comparison of 47 cases used in flow special study to other cases\*, UCSF Adult Glioma Study, 2009-2012 Recruitment Period** |  |  |  |
| Variable | Category | 47 Cases  | Other 90 Cases\* |  |  |  |
| Age | Median Age | 53 | 49 |  |  |  |
| Race | Non-White | 9% | 18% |  |  |  |
|   | White | 91% | 82% |  |  |  |
| Gender | Male | 57% | 63% |  |  |  |
|   | Female | 43% | 37% |  |  |  |
| Histology | GBM | 55% | 57% |  |  |  |
|   | Non-GBM | 45% | 43% |  |  |  |
| TMZ 1st Course | Yes | 81% | 80% |  |  |  |
|   | No | 19% | 20% |  |  |  |
| RAD 1st Course | Yes | 74% | 73% |  |  |  |
|   | No | 26% | 27% |  |  |  |
| Dexamethasone Use | Yes | 15% | 31% |  |  |  |
| at blood draw | No | 85% | 69% |  |  |  |
| \*Other 90 cases in this study from the 2009-2012 recruitment period. |  |  |  |  |
|  |  |  |  |  |  |  |
| **Supplementary Table 4b. Comparison of CD4 Counts for Flow Special Study Cases Stratified by Days Since Treatment Group, UCSF Adult Glioma Study, 2009-2012 Recruitment Period** |  |
| Variable | Days between blood draw and last tx | # | % GBM | CD4 Median | P-value for Difference in Means (Any treatment vs no treatment) | P-value for Difference in Means (excluding not treated group) |
| Chemo Treatment | No chemo/radiation before blood draw | 16 | 38% | 1018 |   |   |
|   | 0-30 days prior to blood draw | 22 | 64% | 282 |   |   |
|   | 31-180 days prior to blood draw | 8 | 75% | 323 | **P<0.001** | P=0.76 |
| Radiation Treatment | No chemo/radiation before blood draw | 16 | 38% | 1018 |   |   |
|   | 0-30 days prior to blood draw | 6 | 67% | 225 |   |   |
|   | 31-180 days prior to blood draw | 15 | 73% | 277 |   |   |
|   | >180 days prior to blood draw | 5 | 80% | 151 | **P<0.001** | P=0.42 |

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| **Supplementary Table 5a. Case/Control lnCCL22 Comparisons Stratified by Temodar Status in Cases,** |  |  |  |  |  |
| **UCSF Adult Glioma Study, 1997-2012** |  |  |  |  |  |  |  |  |
| TMZ Status in Cases | Cases | Controls | OR\* (95% CI) | OR p-value |  |  |  |  |  |
| Given 1st Course | 860 | 976 | 0.22 (0.14, 0.32) | **<0.0001** |  |  |  |  |  |
| Not Given 1st Course | 334 | 976 | 0.29 (0.21, 0.38) | **<0.0001** |  |  |  |  |  |
| Taking TMZ at blood draw | 263 | 976 | 0.22 (0.16, 0.30) | **<0.0001** |  |  |  |  |  |
| Not taking TMZ at blood draw | 945 | 976 | 0.24 (0.17, 0.33) | **<0.0001** |  |  |  |  |  |
| \* Cluster analysis was performed to control for variation within each batch. Models were adjusted for batch number, age (continuous),  |   |   |   |  |
| race (white/non-white), gender, education (college vs no college), and smoking (ever vs never).  |  |  |   |   |   |  |
|  |  |  |  |  |  |   |   |   |  |
| **Supplementary Table 5b. Survival Results Stratified by Temodar Status as 1st Course Therapy in Cases,** |  |  |  |  |  |
| **UCSF Adult Glioma Study, 1997-2012** |  |  |  |  |  |  |  |  |
|  | **Cases who were given Temodar as a 1st course of treatment** |  |  |  |  |  |
| Variable | # | # Deceased | Hazard Ratio | P-Value |  |  |  |  |  |
| Log CCL22 | 860 | 622 | 0.80 (0.70-0.91) | **0.0007** |  |  |  |  |  |
|  | **Cases not given Temodar as a 1st Course of treatment** |   |  |  |  |  |
| Log CCL22 | 334 | 171 | 0.86 (0.65-1.15) | **0.31** |  |  |  |  |  |
| \* The following variables were controlled for in the models: age, gender, race (white/non-white), radiation, surgery,  |
| dexamethasone, smoking (ever/never), college degree (yes/no), blooddays (days between dx and blood draw). |
| The non-TMZ model also included other chemo as a covariate in the model. |  |  |  |  |  |  |

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| **Supplementary Table 6. CCL22 Levels Stratified by Days Since Radiation/Chemotherapy and Dexamethasone Use at Blood Draw, UCSF Adult Glioma Study, 1997-2012** |  |  |
| Case Group | Variable | Outcome | # | LnCCL22 Mean | P-value for Difference in Means\* |
| All Cases | Chemotherapy Treatment | 1. Not given before blood draw | 509 | 0.03 |   |
|   |  | 2. Given 0-30 days prior | 514 | -0.03 | Group 1 vs Groups 2-4: P=0.27 |
|   |  | 3. Given 31-90 days prior | 120 | -0.002 | Among Groups 2-4: P=0.13 |
|   |   | 4. Given >=91 days prior | 51 | 0.17 |  |
|   | Radiation Treatment | 1. Not given before blood draw | 491 | 0.04 |   |
|   |  | 2. Given 0-30 days prior | 337 | -0.04 | Group 1 vs Groups 2-4: P=0.16 |
|   |  | 3. Given 31-90 days prior | 195 | 0.01 | Among Groups 2-4: P=0.50 |
|   |   | 4. Given >=91 days prior | 180 | 0.01 |  |
|   | Dexamethasone Use at Blood Draw | Using Dexamethasone at blood draw | 410 | -0.30 |   |
|   |   | Not using Dexamethasone at blood draw | 798 | 0.16 | **P<0.001** |
| GBM Cases | Chemotherapy Treatment | 1. Not given before blood draw | 215 | -0.16 |   |
|   |  | 2. Given 0-30 days prior | 342 | -0.11 | Group 1 vs Groups 2-4: P=0.20 |
|   |  | 3. Given 31-90 days prior | 88 | -0.04 | Among Groups 2-4: P=0.17 |
|   |   | 4. Given >=91 days prior | 36 | 0.08 |  |
|   | Radiation Treatment | 1. Not given before blood draw | 168 | -0.19 |   |
|   |  | 2. Given 0-30 days prior | 245 | -0.10 | **Group 1 vs Groups 2-4: P=0.04** |
|   |  | 3. Given 31-90 days prior | 142 | -0.07 | Among Groups 2-4: P=0.71 |
|   |   | 4. Given >=91 days prior | 125 | -0.05 |  |
|   | Dexamethasone Use at Blood Draw | Using Dexamethasone at blood draw | 296 | -0.36 |   |
|   |   | Not using Dexamethasone at blood draw | 385 | 0.09 | **P<0.001** |
| Non-GBM Cases | Chemotherapy Treatment | 1. Not given before blood draw | 294 | 0.16 |   |
|   |  | 2. Given 0-30 days prior | 172 | 0.14 | Group 1 vs Groups 2-4: P=0.88 |
|   |  | 3. Given 31-90 days prior | 32 | 0.12 | Among Groups 2-4: P=0.42 |
|   |   | 4. Given >=91 days prior | 15 | 0.36 |  |
|   | Radiation Treatment | 1. Not given before blood draw | 323 | 0.16 |   |
|   |  | 2. Given 0-30 days prior | 92 | 0.11 | Group 1 vs Groups 2-4: P=0.89 |
|   |  | 3. Given 31-90 days prior | 53 | 0.23 | Among Groups 2-4: P=0.59 |
|   |   | 4. Given >=91 days prior | 55 | 0.16 |  |
|   | Dexamethasone Use at Blood Draw | Using Dexamethasone at blood draw | 114 | -0.12 |   |
|   |   | Not using Dexamethasone at blood draw | 413 | 0.24 | **P<0.001** |