Supplementary Fig. 1 CD20-positive B cells often coexpress PAX5.

**a** Overview of the IHC scoring for B cell markers in the Karolinska STS cohort. Note: 15 out of the 17 tumors that were scored negative for CD20 were also negative for PAX5. **b** Immunostaining for CD20 and PAX5 in STS tissue sections showing that the vast majority of CD20-positive cells coexpress PAX5.

| IHC Scoring | CD20 | CD19 | PAX5 |
|-------------|------|------|------|
| 0 (negative) | 17   | 27   | 17   |
| 1 (1-10 cells*) | 6    | 2    | 10   |
| 2 (11-300 cells*) | 7    | 1    | 3    |
| 3 (>300 cells*) | 0    | 0    | 0    |

*Estimated number of cells/tissue section (0.8 cm²)
Supplementary Fig. 2 CD20-positive cells interact with CD8-positive cells and FOXP3-positive cells. **a** Multiplex IHC for CD20 (brown) and CD8 (red), Htx as counterstain, demonstrating direct cell-cell interactions. **b** Immunostaining for CD20 (green fluorophore) and FOXP3 (red chromogenic, fluorescent substrate) demonstrating direct cell-cell interactions. Nuclei are visualized by DAPI.
Supplementary Fig. 3 Kaplan–Meier analysis illustrating the prognostic impact of MS4A1 expression in the SARC STS cohort comparing tumors with low and high expression of CD163.
**Supplementary Table 1** Prognostic significance of CD20 IHC score in comparison to other previously reported prognostic factors. Kaplan–Meier survival analysis using the log-rank test for comparison between groups in the Karolinska STS cohort. The results remained significant in a multivariate Cox regression analysis (see table foot notes and text for details).

| Prognostic Factor     | Metastasis-free Survival |                        | Overall Survival |                        |
|-----------------------|--------------------------|------------------------|------------------|------------------------|
|                       | Survival in months       | P (log rank)           | Survival in months | P (log rank) |
|                       | (95% C.I.)               |                        | (95% C.I.)       |                        |
| CD20                  |                          |                        |                  |                        |
| low                   | 29 (16-41)               | 0.009†                 | 34 (22-45)       | 0.022†                 |
| high                  | 61 (50-72)               |                        | 60 (51-69)       |                        |
| Tumor volume          |                          |                        |                  |                        |
| small                 | 50 (37-61)               | 0.142                  | 50 (37-61)       | 0.231                  |
| large                 | 35 (22-49)               |                        | 37 (24-51)       |                        |
| Tumor grade           |                          |                        |                  |                        |
| 3                     | 57 (45-70)               | 0.044†                 | 61 (50-72)       | 0.016†                 |
| 4                     | 39 (28-50)               |                        | 40 (28-50)       |                        |
| Necrosis              |                          |                        |                  |                        |
| No                    | 48 (47-49)               | 0.822                  | 48 (47-49)       | 0.900                  |
| Yes                   | 41 (31-51)               |                        | 42 (32-52)       |                        |
| Intravascular growth  |                          |                        |                  |                        |
| No                    | 48 (37-58)               | 0.730                  | 50 (38-60)       | 0.637                  |
| Yes                   | 36 (15-57)               |                        | 36 (15-57)       |                        |

†P<0.05 in multivariate Cox regression
**Supplementary Table 2** Co-occurrence of analyzed M1/M2 macrophage gene expression markers in the SARC STS cohort. A gene coexpression analysis demonstrates a correlation between the M1 macrophage markers NOS2 and NOS3, and a correlation between the M2 macrophage markers CD163 and IL10, using the cBioportal software analysis tool.

| Gene A | Gene B | Neither | A Not B | B Not A | Both Log Odds Ratio | P Value | Adjusted* |
|--------|--------|---------|---------|---------|---------------------|---------|-----------|
| NOS2   | NOS3   | 251     | 3       | 6       | 3                   | >3 (co-occurrence) | <0.001   | 0.005     |
| IL10   | CD163  | 242     | 8       | 9       | 4                   | 2.599 (co-occurrence) | 0.001    | 0.014     |
| IL10   | PTGS2  | 238     | 12      | 13      | 0                   | <-3     | 0.537     | 1.000     |
| PTGS2  | CD163  | 237     | 13      | 13      | 0                   | <-3     | 0.509     | 1.000     |
| IL10   | NOS2   | 245     | 12      | 6       | 0                   | <-3     | 0.754     | 1.000     |
| PTGS2  | NOS2   | 244     | 13      | 6       | 0                   | <-3     | 0.736     | 1.000     |
| CD163  | NOS2   | 244     | 13      | 6       | 0                   | <-3     | 0.736     | 1.000     |
| IL10   | NOS3   | 242     | 12      | 9       | 0                   | <-3     | 0.652     | 1.000     |
| PTGS2  | NOS3   | 242     | 12      | 8       | 1                   | 0.925   | 0.371     | 1.000     |
| CD163  | NOS3   | 241     | 13      | 9       | 0                   | <-3     | 0.629     | 1.000     |

*Bonferroni adjusted P Value.