

Supplementary table 1: Patient characteristics of adenoid cystic carcinoma patients (No. 1-15) and salivary duct carcinoma (SDC) patients (No 16-25). All SDCs were androgen-receptor-positive. mo.: months. T: local recurrence of primary tumor. N: Regional lymph node metastases. M: distant metastases. \* patient no. 4 had distant metastases in the pleura, lung, pericard, myocard, subcutaneous tissue, and bone.

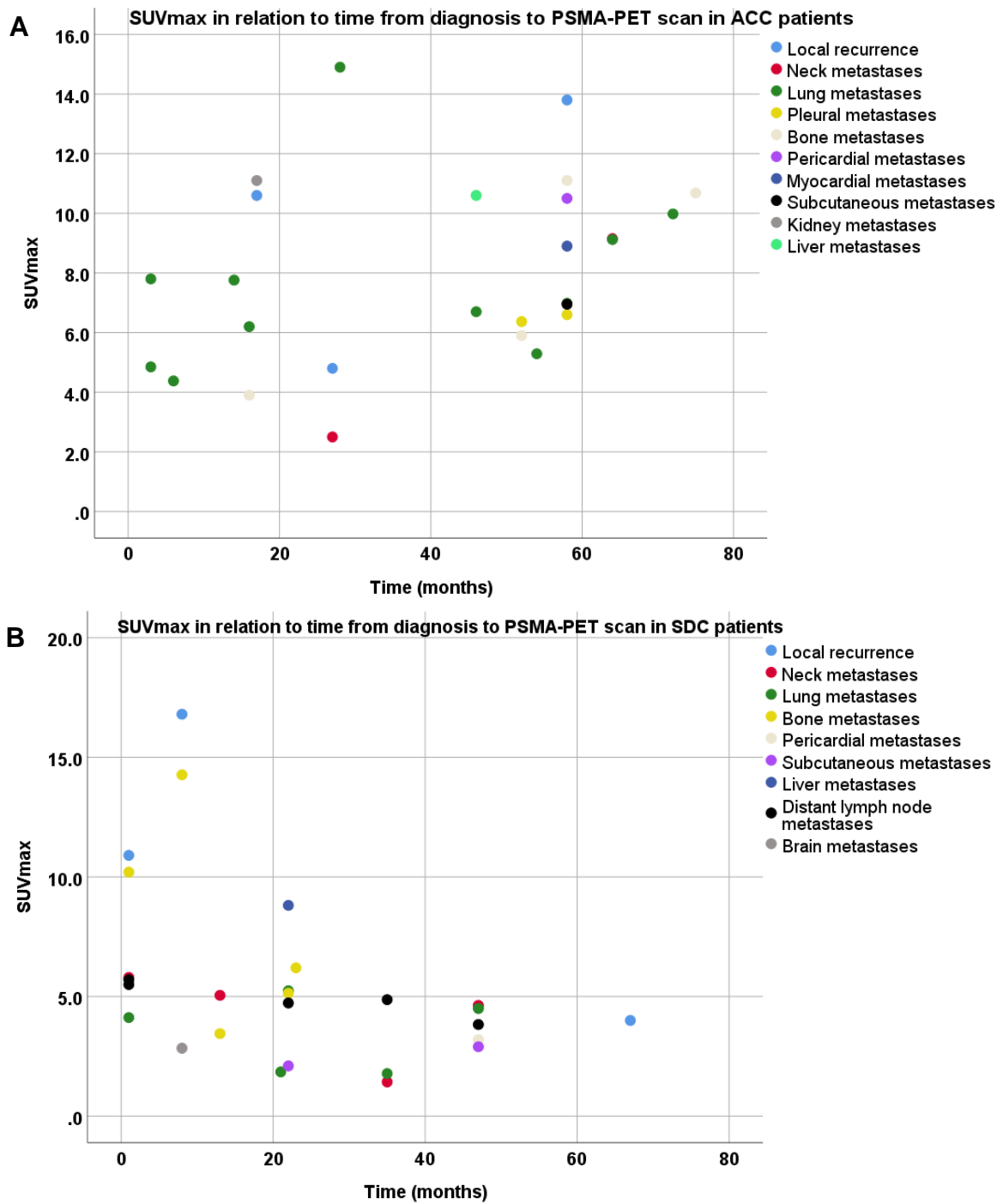
| Adenoid cystic carcinoma patients |        |     |                           |                            |                        |                      |                         |                            |  |  |
|-----------------------------------|--------|-----|---------------------------|----------------------------|------------------------|----------------------|-------------------------|----------------------------|--|--|
| No.                               | Gender | Age | Time from diagnosis (mo.) | Time from recurrence (mo.) | Location primary tumor | ACC subtype          | Primary tumor resection | Postoperative radiotherapy | Location of recurrence                 | Current treatment  |
| 1                                 | Male   | 62  | 88                        | 64                         | Minor salivary glands  | Solid and cribriform | Yes                     | Yes                        | N,M (lung)                             | Watchful waiting   |
| 2                                 | Female | 68  | 251                       | 14                         | Bartholin gland        | Cribriform           | Yes                     | Yes                        | M (lung)                               | Watchful waiting   |
| 3                                 | Male   | 58  | 89                        | 72                         | Trachea                | Solid                | Yes                     | Yes                        | M (lung)                               | Vorinostat 400 mg OD   |
| 4                                 | Male   | 56  | 77                        | 58                         | Bronchus               | Cribriform           | Yes                     | Yes                        | T, M (*)                               | None: baseline scan before start of treatment  |
| 5                                 | Female | 64  | 35                        | 3                          | Submandibular gland    | Cribriform           | Yes                     | Yes                        | M (lung)                               | Watchful waiting   |
| 6                                 | Male   | 44  | 135                       | 75                         | Minor salivary glands  | Solid and cribriform | Yes                     | Yes                        | M (bone)                               | Watchful waiting   |
| 7                                 | Female | 54  | 59                        | 27                         | Parotid gland          | Tubular              | Yes                     | Yes                        | T, N                                   | Watchful waiting   |
| 8                                 | Male   | 76  | 93                        | 54                         | Minor salivary glands  | Cribriform           | No                      | Yes                        | M (lung)                               | Watchful waiting   |
| 9                                 | Male   | 53  | 90                        | 52                         | Minor salivary glands  | Cribriform           | Yes                     | Yes                        | M (pleura, bone)                       | Watchful waiting   |
| 10                                | Male   | 59  | 36                        | 28                         | Parotid gland          | Cribriform           | Yes                     | No                         | M (lung)                               | Watchful waiting   |
| 11                                | Male   | 45  | 49                        | 17                         | Parotid gland          | Cribriform           | Yes                     | Yes                        | T, M (kidney)                          | Watchful waiting   |
| 12                                | Female | 64  | 170                       | 3                          | Submandibular gland    | Cribriform           | Yes                     | Yes                        | M (lung)                               | Watchful waiting   |
| 13                                | Male   | 55  | 54                        | 46                         | Parotid gland          | Cribriform           | Yes                     | Yes                        | M (lung, liver)                        | cyclophosphamide 500 mg/m <sup>2</sup> plus doxorubicin 50 mg/m <sup>2</sup> plus cisplatin 50 mg/m <sup>2</sup> |
| 14                                | Male   | 58  | 176                       | 16                         | Minor salivary glands  | Solid                | Yes                     | No                         | M (lung, bone)                         | Cabozantinib 40 mg OD  |
| 15                                | Male   | 64  | 6                         | 6                          | Sublingual gland       | Cribriform           | Yes                     | No                         | M (lung)                               | Watchful waiting   |
| Salivary duct carcinoma patients  |        |     |                           |                            |                        |                      |                         |                            |  |  |
| No.                               | Gender | Age | Time from diagnosis (mo.) | Time from recurrence (mo.) | Location primary tumor | HER2 status          | Primary tumor resection | Postoperative radiotherapy | Location of recurrence                 | Current treatment  |
| 16                                | Male   | 75  | 66                        | 13                         | Parotid gland          | Positive             | Yes                     | Yes                        | N, M (bone)                            | Goserelin 10.8 mg per 3 months plus bicalutamide 50 mg OD  |
| 17                                | Male   | 55  | 16                        | 1                          | Submandibular gland    | Negative             | Yes                     | Yes                        | N, M (lung, distant lymph nodes)       | None: baseline scan before start of treatment  |
| 18                                | Male   | 79  | 8                         | 1                          | Parotid gland          | Negative             | Yes                     | Yes                        | T, M (lung, bone, distant lymph nodes) | None: baseline scan before start of treatment  |
| 19                                | Male   | 66  | 41                        | 35                         | Parotid gland          | Positive             | Yes                     | Yes                        | N, M (lung, distant lymph nodes)       | Goserelin 10.8 mg per 3 mo. plus bicalutamide 50 mg OD   |

|    |      |    |    |    |               |          |     |     |   |  |
|----|------|----|----|----|---------------|----------|-----|-----|---|--|
| 20 | Male | 70 | 74 | 67 | Parotid gland | Negative | Yes | Yes | T   | Goserelin 10.8 mg per 3 mo. plus bicalutamide 50 mg OD |
| 21 | Male | 58 | 9  | 8  | Parotid gland | Positive | Yes | No  | T, M (brain, bone)  | None: baseline scan before start of treatment          |
| 22 | Male | 75 | 45 | 22 | Parotid gland | Positive | Yes | Yes | M (liver, bone, subcutaneous, distant lymph nodes)          | Trastuzumab 6 mg/kg plus pertuzumab 420 mg fixed dose  |
| 23 | Male | 66 | 42 | 23 | Parotid gland | Negative | Yes | Yes | M (bone)  | Goserelin 10.8 mg per 3 mo. plus bicalutamide 50 mg OD |
| 24 | Male | 69 | 21 | 21 | Parotid gland | Positive | No  | No  | M (lung)  | Trastuzumab-emtansin 3.6 mg/kg                         |
| 25 | Male | 73 | 61 | 47 | Parotid gland | Unknown  | Yes | Yes | N, M (lung, pericardial, subcutaneous, distant lymph nodes) | Bicalutamide 150 mg OD                                 |

Supplementary table 2: Background maximum and mean standardized uptake value's (SUV<sub>max</sub> and SUV<sub>mean</sub>) in adenoid cystic carcinoma (ACC) and salivary duct carcinoma (SDC) patients. SUV<sub>mean</sub> was measured with a 2.4 cm diameter of the region of interest. SD: standard deviation. \* SUV<sub>mean</sub> could not be calculated reliably in the lacrimal gland because measurement with a ROI of 2.4 cm exceeds the size of the gland, and a smaller ROI results in a partial volume effect.

|                       | ACC                                  |                                       | SDC                                  |                                       |
|-----------------------|--------------------------------------|---------------------------------------|--------------------------------------|---------------------------------------|
|                       | Mean SUV <sub>max</sub> ± SD (range) | Mean SUV <sub>mean</sub> ± SD (range) | Mean SUV <sub>max</sub> ± SD (range) | Mean SUV <sub>mean</sub> ± SD (range) |
| Lacrimal gland        | 23.87 ± 9.54 (14.9 – 49.5)           | *                                     | 24.06 ± 8.20 (14.4 – 42.5)           | *                                     |
| Parotid gland         | 26.17 ± 10.45 (14.9 – 56.5)          | 16.19 ± 6.18 (7.8 – 33.0)             | 23.15 ± 6.68 (7.3 – 32.1)            | 14.18 ± 3.99 (4.0 – 17.2)             |
| Submandibular gland   | 26.49 ± 11.93 (9.8 – 55.5)           | 11.74 ± 7.26 (3.2 – 29.6)             | 23.08 ± 7.00 (12.3 – 35.5)           | 9.02 ± 4.04 (3.3 – 16.7)              |
| Sublingual gland      | 16.93 ± 5.69 (4.3 – 22.6)            | 5.91 ± 2.92 (2.1 – 11.0)              | 17.81 ± 6.70 (8.5 – 30.5)            | 6.30 ± 3.78 (2.5 – 12.7)              |
| Lung                  | 1.38 ± 0.36 (0.8 – 2.0)              | 0.64 ± 0.19 (0.3 – 1.1)               | 1.07 ± 0.29 (0.5 – 1.5)              | 0.52 ± 0.13 (0.3 – 0.7)               |
| Mediastinal bloodpool | 2.16 ± 0.52 (1.5 – 3.3)              | 1.14 ± 0.32 (0.8 – 2.1)               | 2.06 ± 0.48 (1.2 – 2.7)              | 1.14 ± 0.21 (0.8 – 1.5)               |
| Liver                 | 6.31 ± 1.24 (4.8 – 9.4)              | 4.00 ± 0.90 (2.5 – 6.2)               | 6.47 ± 2.73 (3.2 – 12.4)             | 4.33 ± 2.02 (2.0 – 8.5)               |
| Duodenum              | 23.02 ± 7.54 (12.3 – 37.2)           | 10.73 ± 3.95 (5.0 – 19.2)             | 18.66 ± 4.67 (11.5 – 25.6)           | 8.96 ± 1.47 (6.6 – 11.1)              |
| Spleen                | 14.84 ± 6.22 (6.1 – 27.2)            | 11.09 ± 5.15 (4.2 – 22.1)             | 10.19 ± 7.36 (5.2 – 29.7)            | 7.14 ± 4.20 (3.7 – 17.5)              |
| Kidney                | 68.04 ± 25.83 (42.3 – 131.6)         | 37.04 ± 14.56 (22.1 – 77.5)           | 57.41 ± 23.31 (18.3 – 102.4)         | 32.73 ± 14.30 (11.7 – 63.1)           |
| Bladder               | 19.12 ± 7.36 (6.5 – 31.7)            | 13.35 ± 4.91 (4.4 – 20.6)             | 15.55 ± 5.32 (10.0 – 25.5)           | 12.09 ± 4.43 (7.7 – 21.2)             |
| Gluteus muscle        | 0.95 ± 0.24 (0.5 – 1.4)              | 0.39 ± 0.12 (0.2 – 0.7)               | 0.88 ± 0.12 (0.6 – 1.0)              | 0.36 ± 0.07 (0.3 – 0.5)               |

Supplementary figure 1: Scatter plot of the time from recurrence to PSMA-PET scan and maximum standardized uptake value's (SUVmax) in recurrent and metastatic lesions of ACC patients (A) and SDC patients (B). Note that patients with x disease site are represented in the figures x times.



Supplementary figure 2: Scatter plot of the percentage of prostate-specific membrane antigen (PSMA)-positive tumor cells in the resected primary tumor and mean  $SUV_{max}$  in recurrent/metastatic disease sites in the same patient, shown for adenoid cystic carcinoma (ACC) patients (A) and salivary duct carcinoma (SDC) patients (B). A scatter plot of the percentage of PSMA-positive tumor cells in biopsied recurrent and/or metastatic lesions and mean  $SUV_{max}$  in the same disease site in the same patient, is shown for ACC patients (C).

