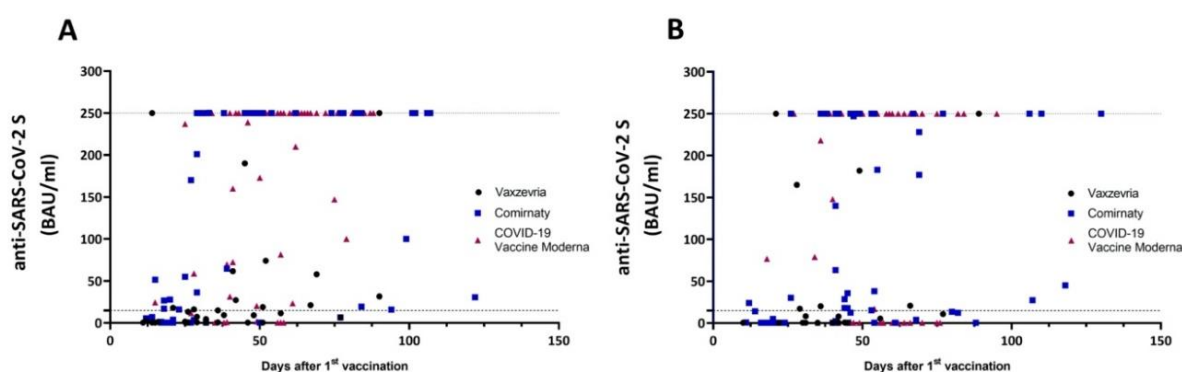


## Supplementary Materials

# Evaluation of Antibody Responses to COVID-19 Vaccines Among Solid Tumor and Hematologic Patients.

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**Figure S1.** Kinetics of antibody formation displayed in days after first COVID-19 vaccination. (A) solid tumor patients; (B) hematologic patients. BAU/mL values of patients vaccinated with Vaxzevria are shown as black circles; patients vaccinated with Comirnaty are displayed as blue squares and antibody levels of patients vaccinated with COVID-19 vaccine Moderna are depicted as red triangles. Threshold (lower dotted line) indicates  $\geq 15$  BAU/mL; the upper dotted line shows the upper limit of the assay (250.01 BAU/mL).

**Table S1.** Patient characteristics and BAU/mL values of all included patients, not vaccinated control group, groups with documented prior COVID-19 infections and vaccinated solid tumor or hematologic patients, respectively.

|  | Patient Characteristics (Age: median; minimum - maximum)   | Vaccine Type<br>(Vaxzevria®/<br>Comirnaty®/<br>COVID-19 Vaccine<br>Janssen®/<br>COVID-19 Vaccine<br>Moderna®) | Ab-analysis after<br>first vaccination<br>(median;<br>minimum-<br>maximum) | Vaccination<br>Scheme<br>completed | Ab-levels ≥<br>15 BAU/ml | BAU/ml<br>Median (95%<br>CI of median)       |
|--|--|---|--|------------------------------------|--------------------------|--|
| <b>Included patients<br/>(total)</b>   | 441: 215 female, 226 male<br>(Age: 67yrs; 23yrs-93yrs)<br>Solid tumor patients: 269<br>(137 female, 123 male; 65yrs; 23-90yrs)<br>Hematologic patients: 172<br>(78 female, 94 male; 70yrs; 25-93yrs) |   |  |                                    |                          |  |
| <b>Patients without<br/>vaccination or prior<br/>documented<br/>COVID-Infection</b>  | 124: 69 female, 55 male<br>(64yrs; 23-93yrs)<br>75 solid tumor patients<br>49 hematologic patients   | not applicable  | not applicable   | 0%                                 | 0.8%                     | 0.39 (0.39-0.39)                             |
| <b>Patients without<br/>vaccination but prior<br/>documented<br/>COVID-Infection</b> | 16<br>11 solid tumor patients<br>6 female, 5 male (72yrs; 45-87yrs)<br>5 hematologic patients<br>2 female, 3 male (54yrs; 25-84yrs)  | not applicable  | not applicable   | 0%                                 | 100%                     | 250.0 (67.2-<br>250.0)                       |
| <b>Patients with<br/>vaccination plus<br/>prior documented<br/>COVID-Infection</b>   | 6<br>3 solid tumor patients<br>0 female, 3 male (69yrs; 28-79yrs)<br>3 hematologic patients<br>2 female, 1 male (82yrs; 72-85yrs)  | 1/2/0/0<br>0/3/0/0  | not applicable   | 16.7%<br>66.6%                     | 100%<br>33.3%            | 250.0 (250.0-<br>250.0)<br>0.56 (0.39-250.0) |
| <b>Vaccinated solid<br/>tumor patients</b>   | 171<br>84 female, 87 male (66yrs, 28-90yrs)  | 29/46/1/95  | 50d; 12-122d   | 76%                                | 78.4%                    | 250.0 (250.0-<br>250.0)                      |
| <b>Vaccinated<br/>hematologic patients</b>   | 107<br>49 female, 58 male (74yrs, 25-89yrs)  | 21/44/0/42  | 49d; 10-130d   | 72.9%                              | 53.3%                    | 17.9 (4.89-76.70)                            |

Yrs: years; BAU/ml: Binding Antibody Units/Milliliter; CI: Confidence Interval.

**Table S2.** Patient characteristics and BAU/mL values of vaccinated solid tumor or hematologic patients, grouped by gender or age.

|                                       | Patient Characteristics<br>(Age; Median;<br>Minimum–Maximum) | Vaccine Type<br>(Vaxzevria®/Comirnaty®/COVID-19<br>Vaccine Janssen®/COVID-19 Vaccine<br>Moderna®) | Ab-Analysis After<br>First Vaccination<br>(Median; Minimum–<br>Maximum) | Vaccination<br>Scheme<br>Completed | Ab-Levels<br>≥15 BAU/mL | BAU/mL<br>Median<br>(95% CI of<br>Median) |
|---------------------------------------|--|---|---|------------------------------------|-------------------------|---|
| Vaccinated<br>solid tumor<br>patients | <b><u>Gender:</u></b>  |   |   |                                    |                         |   |
|                                       | <i>Female</i>  |   |   |                                    |                         |   |
|                                       | 84 (64 yrs; 33–85 yrs)                                       | 14/22/0/48  | 53d; 12–122d  | 78.6%                              | 86.9%                   | 250.0<br>(250.0–250.0)                    |
|                                       | <i>Male</i>  |   |   |                                    |                         |   |
|                                       | 87 (68 yrs; 28–90 yrs)                                       | 15/24/1/47  | 46d; 12–87d   | 73.6%                              | 70.1%                   | 250.0<br>(64.6–250.0)                     |
|                                       | <b><u>Age:</u></b>   |   |   |                                    |                         |   |
|                                       | <i>≤40 years</i>   |   |   |                                    |                         |   |
|                                       | 7: 3 female, 4 male<br>(33 yrs; 28–40 yrs)                   | 1/4/1/1   | 25d; 14–122d  | 57.1%                              | 71.4%                   | 250.0<br>(0.39–250.0)                     |
|                                       | <i>41–60 years</i>   |   |   |                                    |                         |   |
|                                       | 43: 26 female, 17 male<br>(56 yrs; 42–60 yrs)                | 9/6/0/28  | 56d; 16–106d  | 79.1%                              | 83.7%                   | 250.0<br>(250.0–250.0)                    |
| Vaccinated<br>hematologic<br>patients | <i>61–80 years</i>   |   |   |                                    |                         |   |
|                                       | 110: 52 female, 58 male<br>(69 yrs; 61–80 yrs)               | 15/32/0/63  | 49d; 12–122d  | 78.2%                              | 80%                     | 250.0<br>(250.0–250.0)                    |
|                                       | <i>≥81 years</i>   |   |   |                                    |                         |   |
|                                       | 11: 3 female, 8 male<br>(84 yrs; 81–90 yrs)                  | 4/4/0/3   | 38d; 19–84d   | 54.5%                              | 45.5%                   | 9.32<br>(0.39–210.0)                      |
|                                       | <b><u>Gender:</u></b>  |   |   |                                    |                         |   |
|                                       | <i>Female</i>  |   |   |                                    |                         |   |
|                                       | 49: (73 yrs; 31–89 yrs)                                      | 13/19/0/17  | 49d; 10–130d  | 67.4%                              | 55.1%                   | 24.0<br>(2.41–250.0)                      |
|                                       | <i>Male</i>  |   |   |                                    |                         |   |
|                                       | 58: (75 yrs; 25–85 yrs)                                      | 8/25/0/24   | 49d; 11–107d  | 72.9%                              | 51.7%                   | 16.05<br>(0.66–76.7)                      |
|                                       | <b><u>Age:</u></b>   |   |   |                                    |                         |   |
| Vaccinated<br>hematologic<br>patients | <i>≤40 years</i>   |   |   |                                    |                         |   |
|                                       | 7: 4 female, 3 male<br>(37 yrs; 25–40 yrs)                   | 0/6/0/1   | 56d; 12–130d  | 57.1%                              | 71.4%                   | 28.5<br>(0.39–250.0)                      |
|                                       | <i>41–60 years</i>   |   |   |                                    |                         |   |
|                                       | 19: 8 female, 11 male<br>(53 yrs; 45–60 yrs)                 | 8/3/0/8   | 50d; 28–106d  | 68.4%                              | 57.9%                   | 20.7<br>(0.39–250.0)                      |
|                                       | <i>61–80 years</i>   |   |   |                                    |                         |   |
|                                       | 62: 31 female, 31 male<br>(75 yrs; 62–80 yrs)                | 9/24/0/29   | 46d; 11–107d  | 74.2%                              | 50%                     | 14.65<br>(0.66–182.0)                     |
| Vaccinated<br>hematologic<br>patients | <i>≥81 years</i>   |   |   |                                    |                         |   |
|                                       | 19: 6 female, 13 male<br>(83 yrs; 81–89 yrs)                 | 4/11/0/4  | 54d; 10–118d  | 78.9%                              | 52.6%                   | 16.8<br>(0.39–148.0)                      |

Yrs: years; BAU/ml: Binding Antibody Units/Milliliter; CI: Confidence Interval.

**Table S3.** Patient characteristics and BAU/mL values of vaccinated solid tumor or hematologic patients, grouped by therapy status.

|  | Patient Characteristics<br>(Age: Median;<br>Minimum–Maximum)             | Vaccine Type<br>(Vaxzevria®/Comirnaty®/<br>COVID-19 Vaccine<br>Janssen®/COVID-19<br>Vaccine Moderna®) | Ab-Analysis After<br>First Vaccination<br>(Median; Minimum–<br>Maximum) | Vaccination<br>Scheme<br>Completed | Ab-Levels<br>≥15 BAU/mL | BAU/mL<br>Median<br>(95% CI of<br>Median) |
|--|--|---|---|------------------------------------|-------------------------|---|
| <b>Vaccinated<br/>solid tumor<br/>patients</b> | <u>Observation only</u><br>32: 16 female, 16 male<br>(70 yrs; 28–85 yrs) | 7/16/0/9  | 47d; 14–107d  | 71.9%                              | 87.5%                   | 250.0 (190.0–<br>250.0)                   |
|  | <u>Ongoing therapy</u><br>139: 68 female, 71 male<br>(65 yrs; 33–90 yrs) | 22/30/1/86  | 50d; 12–122d  | 7%                                 | 76.3%                   | 250.0 (239.0–<br>250.0)                   |
| <b>Vaccinated<br/>hematologic<br/>patients</b> | <u>Observation only</u><br>39: 22 female, 17 male<br>(72 yrs, 25–88 yrs) | 10/14/0/15  | 49d; 11–118d  | 64.1%                              | 59%                     | 28.5 (7.82–250.0)                         |
|  | <u>Ongoing therapy</u><br>68: 27 female, 41 male<br>(76 yrs, 31–89 yrs)  | 11/30/0/27  | 49d; 10–130d  | 77.9%                              | 50%                     | 13.8 (0.4–78.8)                           |

Yrs: years; BAU/ml: Binding Antibody Units/Milliliter; CI: Confidence Interval.

**Table S4.** Patient characteristics and BAU/mL values of vaccinated solid tumor or hematologic patients, grouped by different oncologic treatments.

|                                       | Patient Characteristics<br>(Age: Median;<br>Minimum–Maximum)   | Vaccine Type<br>(Vaxzevria®/Comirnaty®/<br>COVID-19 Vaccine<br>Janssen®/COVID-19<br>Vaccine Moderna®) | Ab-Analysis After<br>First Vaccination<br>(Median; Minimum–<br>Maximum) | Vaccination<br>Scheme<br>Completed | Ab-Levels<br>≥15 BAU/mL | BAU/mL<br>Median<br>(95% CI of<br>median) |
|---------------------------------------|--|---|---|------------------------------------|-------------------------|---|
| Vaccinated<br>solid tumor<br>patients | <u>Chemotherapy (alone, + targeted<br/>therapy, + hormonal therapy, +<br/>immunotherapies other than ICI)</u><br>71: 42 female, 29 male<br>(66 yrs; 33–90 yrs) | 12/15/1/43  | 50d; 12–122d  | 74.7%                              | 70.4%                   | 250.0<br>(36.3–250.0)                     |
|                                       | <u>ICI alone or ICI + ICI</u><br>28: 8 female, 20 male<br>(65 yrs; 52–84 yrs)  | 4/2/0/22  | 53d; 21–90d   | 85.7%                              | 85.7%                   | 250.0<br>(210.0–250.0)                    |
|                                       | <u>Chemotherapy + ICI</u><br>6: 3 female, 3 male<br>(64 yrs; 52–80 yrs)  | 0/1/0/5   | 56d; 32–62d   | 100%                               | 83.3%                   | 250.0<br>(0.39–250.0)                     |
|                                       | <u>ICI + TKI</u><br>2: 0 female, 2 male<br>(64 yrs, 75 yrs)  | 0/1/0/1   | 55d; 32–77d   | 50%                                | 100%                    | 250.0<br>(250.0–250.0)                    |
|                                       | <u>Other therapies (TKI, Hormonal<br/>therapy, Radiation)</u><br>32: 18 female, 14 male<br>(66 yrs; 40–82 yrs)   | 6/11/0/15   | 48d; 12–88d   | 71.9%                              | 78.1%                   | 250.0 (26.8–250.0)                        |
| Vaccinated<br>hematologic<br>patients | <u>Chemotherapy-containing regimens</u><br>9: 4 female, 5 male<br>(79 yrs; 45–87 yrs)  | 2/7/0/0   | 49d; 31–107d  | 77.8%                              | 66.7%                   | 27.3<br>(0.65–250.0)                      |
|                                       | <u>Hypomethylating agents</u><br>4: 1 female, 3 male<br>(83 yrs; 69–89 yrs)  | 1/2/0/1   | 47d; 40–56d   | 75%                                | 50%                     | 10.36<br>(0.39–148.0)                     |
|                                       | <u>IMiD-containing regimens</u><br>9: 5 female, 4 male<br>(72 yrs; 57–86 yrs)  | 1/1/0/7   | 50d; 34–69d   | 77.8%                              | 88.9%                   | 250.0<br>(78.8–250.0)                     |
|                                       | <u>BTkI treatment</u><br>2: 1 female, 1 male<br>(67 yrs; 76 yrs)   | 0/0/0/2   | 62d; 60–64d   | 100%                               | 0%                      | 0.39<br>(0.39–0.39)                       |
|                                       | <u>Anti-CD20 treatment<br/>within the last 5 years</u><br>24: 8 female, 16 male<br>(75 yrs, 39–88 yrs)   | 4/5/0/15  | 55d; 10–88d   | 79.2%                              | 8.3%                    | 0.39<br>(0.39–0.39)                       |
|                                       | <u>Interferon α-2a</u><br>5: 3 female, 2 male<br>(46 yrs; 37–75 yrs)   | 3/2/0/0   | 67d; 36–72d   | 40%                                | 0%                      | 20.1<br>(0.72–250.0)                      |
|                                       | <u>Other therapies (Anagrelid,<br/>Ciclosporin, Imatinib, Prednisolon,<br/>Romiplostim, Phlebotomy)</u><br>15: 5 female, 10 male<br>(75 yrs, 31–83 yrs)        | 0/13/0/2  | 36d; 12–82d   | 66.7%                              | 60%                     | 247.0<br>(2.23–250.0)                     |

Yrs: years; BAU/ml: Binding Antibody Units/Milliliter; CI: Confidence Interval; ICI: Immune Checkpoint Inhibitor; TKI: Tyrosine Kinase Inhibitor; IMiD: Immunomodulatory Imide Drug; BTkI: Bruton's Tyrosine Kinase Inhibitor.

**Table S5.** Patient characteristics and BAU/mL values of solid tumor or hematologic patients, grouped by type of disease.

|                                       | Patient Characteristics<br>(Age: Median;<br>Minimum–Maximum)   | Vaccine Type<br>(Vaxzevria®/Comirnaty®/<br>COVID-19 Vaccine<br>Janssen®/COVID-19<br>Vaccine Moderna®) | Ab-Analysis After<br>First Vaccination<br>(Median; Minimum–<br>Maximum) | Vaccination<br>Scheme<br>Completed | Ab-Levels<br>≥15 BAU/mL | BAU/mL<br>Median<br>(95% CI of<br>Median) |
|---------------------------------------|--|---|---|------------------------------------|-------------------------|---|
| Vaccinated<br>solid tumor<br>patients | <u>SCLC + NSCLC Patients</u><br>28: 10 female, 18 male<br>(62 yrs; 42–84 yrs)<br>0 observation, 28 ongoing therapy                       | 1/1/0/26  | 58d; 32–90d   | 100%                               | 96.4%                   | 250.0<br>(250.0–250.0)                    |
|                                       | <u>Mammary Carcinoma Patients</u><br>29: 28 female, 1 male<br>(64 yrs; 43–80 yrs)<br>3 observation, 26 ongoing therapy                   | 5/9/0/15  | 51d; 12–106d  | 79.3%                              | 86.2%                   | 250.0<br>(190.0–250.0)                    |
|                                       | <u>Gastrointestinal Cancer Patients</u><br>48: 22 female, 26 male<br>(71 yrs; 38–90 yrs)<br>12 observation, 36 ongoing therapy           | 6/17/0/25   | 48d; 14–122d  | 75%                                | 70.8%                   | 250.0<br>(30.6–250.0)                     |
|                                       | <u>Urogenital Cancer Patients</u><br>40: 7 female, 33 male<br>(68 yrs; 28–86 yrs)<br>8 observation, 32 ongoing therapy                   | 10/11/1/18  | 42d; 12–102d  | 65%                                | 70%                     | 141.2<br>(16.2–250.0)                     |
|                                       | <u>Gynecological Cancer Patients</u><br>6: 6 female, 0 male<br>(66 yrs; 56–85 yrs)<br>0 observation, 6 ongoing therapy                   | 1/2/0/3   | 54d; 20–84d   | 66.7%                              | 100%                    | 138.9<br>(18.9–250.0)                     |
|                                       | <u>ENT Cancer Patients</u><br>9: 4 female, 5 male<br>(68 yrs; 62–90 yrs)<br>1 observation, 8 ongoing therapy                             | 2/0/0/7   | 50d; 21–81d   | 77.8%                              | 77.8%                   | 173.0<br>(0.39–250.0)                     |
|                                       | <u>Patients with other cancers</u><br>12: 7 female, 5 male<br>(63 yrs; 33–85 yrs)<br>4 observation, 8 ongoing therapy                    | 5/5/0/2   | 47d; 25–102d  | 50%                                | 58.3%                   | 243.5<br>(4.62–250.0)                     |
|                                       | <u>Myeloid Disorders</u><br>36: 13 female, 23 male<br>(77 yrs; 37–89 yrs)<br>6 observation, 30 ongoing therapy                           | 7/21/0/8  | 48d; 11–107d  | 69.4%                              | 58.3%                   | 19.05<br>(5.42–247.0)                     |
|                                       | <u>Lymphoid Disorders</u><br>69: 36 female, 33 male<br>(71 yrs; 25–88 yrs)<br>34 observation, 35 ongoing therapy                         | 14/21/0/33  | 49d; 10–130d  | 69.6%                              | 49.3%                   | 14.0<br>(0.39–78.8)                       |
|                                       | <u>Other Disorders (Aplastic Anemia,<br/>Hemochromatosis)</u><br>2: 0 female, 2 male<br>(75, 76 yrs)<br>0 observation, 2 ongoing therapy | 0/2/0/0   | 43d; 38–48d   | 100%                               | 100%                    | 250.0<br>(250.0–250.0)                    |

Yrs: years; BAU/mL: Binding Antibody Units/Milliliter; CI: Confidence Interval; SCLC: Small Cell Lung Cancer; NSCLC: Non-Small Cell Lung Cancer; ENT: Ear-Nose-Throat.

**Table S6.** Patient characteristics and BAU/mL values of all vaccinated hematologic patients with lymphoid disorders, grouped by cell of origin of the disease.

|   | Patient characteristics<br>(Age: Median;<br>Minimum –Maximum)                          | Vaccine Type<br>(Vaxzevria®/Comirnaty®/COVID-19<br>Vaccine Janssen®/COVID-19<br>Vaccine Moderna®) | Ab-Analysis After<br>First Vaccination<br>(Median; Minimum–<br>Maximum) | Vaccination<br>Scheme<br>Completed | Ab-Levels<br>≥15 BAU/mL | BAU/mL<br>Median<br>(95% CI of<br>Median) |
|---|--|---|---|------------------------------------|-------------------------|---|
| Vaccinated<br>hematologic<br>patients with<br>Lymphoid<br>Disorders | <u>B-Cell Disorders</u>  |   |   |                                    |                         |   |
|   | 41: 20 female, 21 male<br>(71 yrs; 31–88 yrs)<br>20 observation, 21 ongoing<br>therapy | 11/10/0/20  | 47d; 10–84d   | 65.9%                              | 31.7%                   | 0.39<br>(0.39–14.0)                       |
|   | <u>Plasma Cell Disorders</u>   |   |   |                                    |                         |   |
|   | 21: 11 female, 10 male<br>(72 yrs, 40–88 yrs)<br>7 observation, 14 ongoing<br>therapy  | 3/7/0/10  | 50d; 24–130d  | 81%                                | 81%                     | 250.0<br>(28.5–250.0)                     |
|   | <u>Mb. Hodgkin +<br/>Other Lymphoid Disorders</u>                                      |   |   |                                    |                         |   |
|   | 7: 5 female, 2 male<br>(68 yrs; 25–88 yrs)<br>7 observation, 0 ongoing<br>therapy      | 0/4/0/3   | 61d; 27–88d   | 71.4%                              | 57.1%                   | 177.0<br>(0.39–250.0)                     |

Yrs: years; BAU/ml: Binding Antibody Units/Milliliter; CI: Confidence Interval



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