

**Supplementary information**

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**Vaccination in patients with kidney failure:  
lessons from COVID-19**

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**Supplementary Table 1. Immune response of patients receiving dialysis and kidney transplant recipients after a COVID-19 prime—boost vaccination course**

Study	Kidney replacement therapy	Vaccine	Time after last vaccination (weeks)	Sample (N)	Binding humoral response (%)	Neutral. humoral response (%)	T cell response (% of all)
Agur <sup>1</sup>	HD	BNT162b2	2-6	122	93.4	NA	NA
	PD			23	95.7	NA	NA
Anand <sup>2</sup>	HD	BNT162b2, mRNA-1273 and Ad26.COV2.S	2	519	92.1	NA	NA
Attias <sup>3</sup>	HD	BNT162b2	6-7	64	85.9	NA	NA
Bachelet <sup>4</sup>	HD	BNT162b2	4	193	94.3	NA	NA
Bassi <sup>5</sup>	HD	BNT162b2 and mRNA-1273	2-3	130	94.4	51.0	NA
	PD			13			NA
Benotman e <sup>6</sup>	Tx	mRNA-1273	4	205	47.8	NA	NA
Berar Yanay <sup>7</sup>	HD	BNT162b2	Up to 10	127	90.0	NA	NA
	PD			33			NA
Bertrand <sup>8</sup>	HD	BNT162b2	4	9	88.9	NA	100.0 <sup>a</sup>
	Tx			45	17.8	NA	57.8 <sup>a</sup>
Bertrand <sup>9</sup>	HD	BNT162b2	3-9	62	91.9	NA	NA
	Tx			235	27.7	NA	NA
Billany <sup>10</sup>	HD	AZD1222 and BNT162b2	4	94	79.8	NA	NA
Boyarsky <sup>11</sup>	Tx	BNT162b2 and mRNA-1273	4	322	47.8	NA	NA
Broseta AJKD <sup>12</sup>	HD	BNT162b2 and mRNA-1273	3	205	95.4	NA	62.3 <sup>b</sup>
Broseta NDT <sup>13</sup>	HD	mRNA-1273	7	78	94.9	NA	NA
Chan <sup>14</sup>	HD	mRNA-1273	1	41	92.7	NA	NA
Chavarot <sup>15</sup>	Tx	BNT162b2	5	35*	5.7	30.4	NA
Cucchiari <sup>16</sup>	Tx	mRNA-1273	2	117	29.9	NA	54.7 <sup>a</sup>
Danthu <sup>17</sup>	HD	BNT162b2	1	75	78.7	NA	NA
	Tx			72	4.2	NA	NA
Dębska-Ślizień <sup>18</sup>	Tx	BNT162b2 and mRNA-1273	2-3	142	51.4	NA	NA
Devresse <sup>19</sup>	Tx	BNT162b2	4	90	64.4	NA	32.2 <sup>c</sup>
Ducloux <sup>20</sup>	HD	BNT162b2	4	50	90.0	NA	NA
Ducloux <sup>21</sup>	Tx	BNT162b2	4	153	79.1	NA	NA
Espi <sup>22</sup>	HD	BNT162b2	2	92	79.3	NA	62.5 <sup>c</sup>
Firket <sup>23</sup>	Tx	BNT162b2	2	10	10.0	NA	NA
Frantzen <sup>24</sup>	HD	BNT162b2	4	244	90.6	NA	NA
Garcia <sup>25</sup>	HD	BNT162b2, mRNA-1273 and Ad26.COV2.S	4-9	1468	92.3	NA	NA
Georgery <sup>26</sup>	Tx	BNT162b2	4	79	50.0	NA	NA

Giot <sup>27</sup>	HD	BNT162b2	3	70	77.1	52.9	NA
Grupper <sup>28</sup>	HD	BNT162b2	2	72	96.0	NA	NA
Grupper <sup>29</sup>	Tx	BNT162b2	2	136	37.5	NA	NA
Hall <sup>30</sup>	Tx	mRNA-1273	4-6	110	34.5	26.9	47.9 <sup>b</sup>
Haskin <sup>31</sup>	Tx	BNT162b2	3-8	38	63.2	NA	NA
Hod <sup>32</sup>	Tx	BNT162b2	2-6	120	48.3	35.0	NA
Hsu <sup>33</sup>	HD	BNT162b2, mRNA-1273 and Ad26.COVS.S	2	1330	78.5	NA	NA
	PD			198		NA	NA
Husain <sup>34</sup>	Tx	BNT162b2 and mRNA-1273	2-6	25	20.0	NA	NA
Jahn <sup>35</sup>	HD	BNT162b2	2	72	93.1	NA	NA
Kaiser <sup>36</sup>	HD	BNT162b2 and mRNA-1273	3	116	97.4	NA	NA
Kolb <sup>37</sup>	HD	BNT162b2	2	31	87.5	62.5	NA
	PD			1			NA
	Tx	BNT162b2 and mRNA-1273		28	35.7	21.4	NA
Korth <sup>38</sup>	Tx	BNT162b2	2	23	21.7	NA	NA
Labriola <sup>39</sup>	HD	BNT162b3	1	24	79.2	NA	NA
Lacson <sup>40</sup>	HD	BNT162b2 and mRNA-1273	2-4	181	89.0	NA	NA
	PD			5	80.0	NA	NA
Longlune <sup>41</sup>	HD	BNT162b2	4	82	84.1	NA	NA
	PD			20	85.0	NA	NA
Marinaki <sup>42</sup>	Tx	BNT162b2	1-2	10	20.0	NA	NA
Marion <sup>43</sup>	Tx	BNT162b2 and mRNA-1273	4	271	33.0	NA	NA
Martín-García <sup>44</sup>	HD	mRNA-1273	8	30	100.0	NA	NA
	PD			12	100.0	NA	NA
	Tx			73	53.0	NA	NA
Masset <sup>45</sup>	Tx	BNT162b2	4	456	49.8	NA	NA
Melin <sup>46</sup>	HD	BNT162b2	7-15	50	84.0	NA	58.0 <sup>a</sup>
Midtvedt <sup>47</sup>	Tx	BNT162b2	4	141	17.7	NA	NA
Mulhern <sup>48</sup>	HD	BNT162b2, mRNA-1273 and Ad26.COVS.S	2-4	64	59.4	NA	NA
Ou <sup>49</sup>	Tx	BNT162b2 and mRNA-1273	4	609	31.4	NA	NA
Paal <sup>50</sup>	HD	BNT162b2 and mRNA-1273	3-6	249	96.6	NA	NA
Pedersen <sup>51</sup>	Tx	BNT162b2	4	58	48.3	31.0	NA
Predecki <sup>52</sup>	Tx	AZD1222 and BNT162b2	4	768	55.3	NA	NA
Rahav <sup>53</sup>	Tx	BNT162b2	2-4	110	45.5	NA	NA
Rincon-Arevalo <sup>54</sup>	HD	BNT162b2	1	40	70.5	68.2	NA
	PD			4			NA
	Tx			40	2.5	0.0	NA

Robert <sup>55</sup>	HD	BNT162b2	4	53	84.9	NA	NA
Rodriguez-Espinosa <sup>56</sup>	PD	mRNA-1273	3	32	96.9	NA	NA
Rozen-Zvi <sup>57</sup>	Tx	BNT162b2	2-4	308	36.4	NA	NA
Russo <sup>58</sup>	Tx	BNT162b2	3-9	82	52.4	NA	NA
Santos-Araújo <sup>59</sup>	HD	BNT162b2	6	262	93.1	NA	NA
Sattler <sup>60</sup>	HD	BNT162b2	1	26	84.6	76.9	100.0 <sup>b</sup>
	Tx			39	10.3	0.0	92.0 <sup>b</sup>
Schrezenmeier <sup>61</sup>	HD	BNT162b2	3-4	34	88.9	77.8	67.7 <sup>c</sup>
	PD			2			
Simon <sup>62</sup>	HD	BNT162b2	3	81	72.8	NA	NA
Speer Front Med <sup>63</sup>	HD	BNT162b2	3	30	80.0	80.0	NA
Speer Vacc <sup>64</sup>	HD	BNT162b2	12	124	86.0	NA	NA
	PD			41	92.0	NA	NA
Strengert <sup>65</sup>	HD	BNT162b2	3	81	95.1	NA	71.6 <sup>c</sup>
Stumpf <sup>66</sup>	HD	BNT162b2 and mRNA-1273	4-5	1136	94.5	94.7	78.2 <sup>b</sup>
	Tx			333	33.6	65.8	29.8 <sup>b</sup>
Thieme <sup>67</sup>	HD	BNT162b2	2	34	79.0	56.0	79.0 <sup>b</sup>
Tylicki <sup>68</sup>	HD	BNT162b2	2-3	91	95.6	NA	NA
Van Praet <sup>69</sup>	HD	BNT162b2 and mRNA-1273	4-5	543	81.6	NA	75.7 <sup>c</sup>
Wijtvliet <sup>70</sup>	HD	BNT162b2 and mRNA-1273	3-4	138	92.8	NA	NA
	PD					NA	NA
	Tx			133	62.4	NA	NA
Yau <sup>71</sup>	HD	BNT162b2	2	72	95.8	NA	NA
Zitt <sup>72</sup>	HD	BNT162b3	4	47	97.9	NA	NA

The table summarizes the studies on COVID-19 vaccine specific immunity in patients with kidney failure. Only patients with a complete vaccination course and no known history of SARS-CoV-2 infection were considered for this summary. <sup>a</sup>Antiviral T cell immune response measured by IFN- $\gamma$ -ELISpot. <sup>b</sup>Antiviral CD4<sup>+</sup> T cell immune response as measured by flow cytometry <sup>c</sup>Antiviral T cell immune response measured by IFN- $\gamma$  release assay \*All patients in this cohort were treated with belatacept. HD, haemodialysis; NA, not available; PD, peritoneal dialysis; Tx, transplantation.

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