

## Supplementary appendix

Chen XF, Wu XF, Wu H, et al. Camrelizumab plus gemcitabine and oxaliplatin (GEMOX) in patients with advanced biliary tract cancer: a single-arm open-label, phase 2 trial.

**Supplementary Table S1.** Patient baseline characteristics.

**Supplementary Table S2.** Responses and survival by PD-L1 expression and tumor mutational burden.

**Supplementary Figure S1.** Kaplan-Meier Estimates of Progression-Free Survival and Overall Survival by PD-L1 Expression Status.

**Supplementary Figure S2.** Immune cells in center or invasive margin between responders and non-responders.

**Supplementary Figure S3.** Kaplan-Meier Estimates of Progression-Free Survival and Overall Survival by TMB Status or gene mutation.

**Supplementary Figure S4.** The association between survival and ctDNA status or bTMB.

**Supplementary Figure S5.** The association between survival and ctDNA status in non-responders and responders.

This supplementary material has been provided by the authors to give readers additional information about their work.

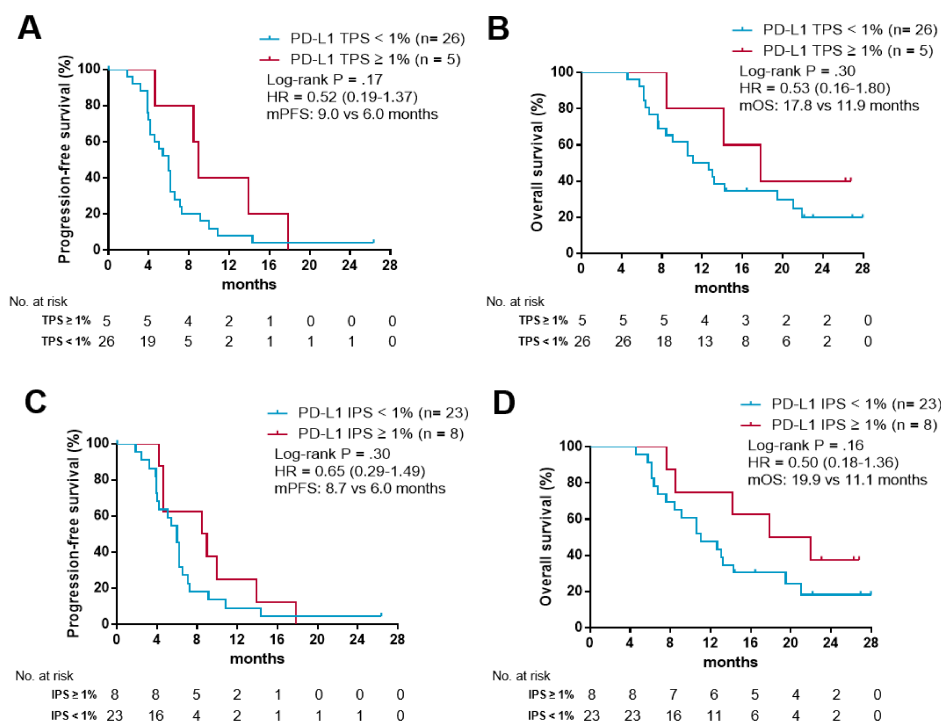
| Characteristic                             | camrelizumab + GEMOX<br>(N = 37) |
|--|----------------------------------|
| Age – yr                                   |                                  |
| Median                                     | 64                               |
| Range                                      | 41-74                            |
| Primary site – no. (%)                     |                                  |
| Cholangiocarcinoma                         | 22 (59)                          |
| Gallbladder cancer                         | 15 (41)                          |
| Gender – no. (%)                           |                                  |
| Male                                       | 26 (70)                          |
| Female                                     | 11 (30)                          |
| Disease stage – no. (%)                    |                                  |
| IV   | 37(100)                          |
| Sites of distant metastases                |                                  |
| Liver                                      | 34 (92)                          |
| Lymph node                                 | 13 (35)                          |
| Peritoneum                                 | 12 (32)                          |
| Lung                                       | 6 (16)                           |
| ECOG performance-status score – no.<br>(%) |                                  |
| 0  | 13 (35)                          |
| 1  | 24 (65)                          |

**Supplementary Table S1. Patient baseline characteristics**

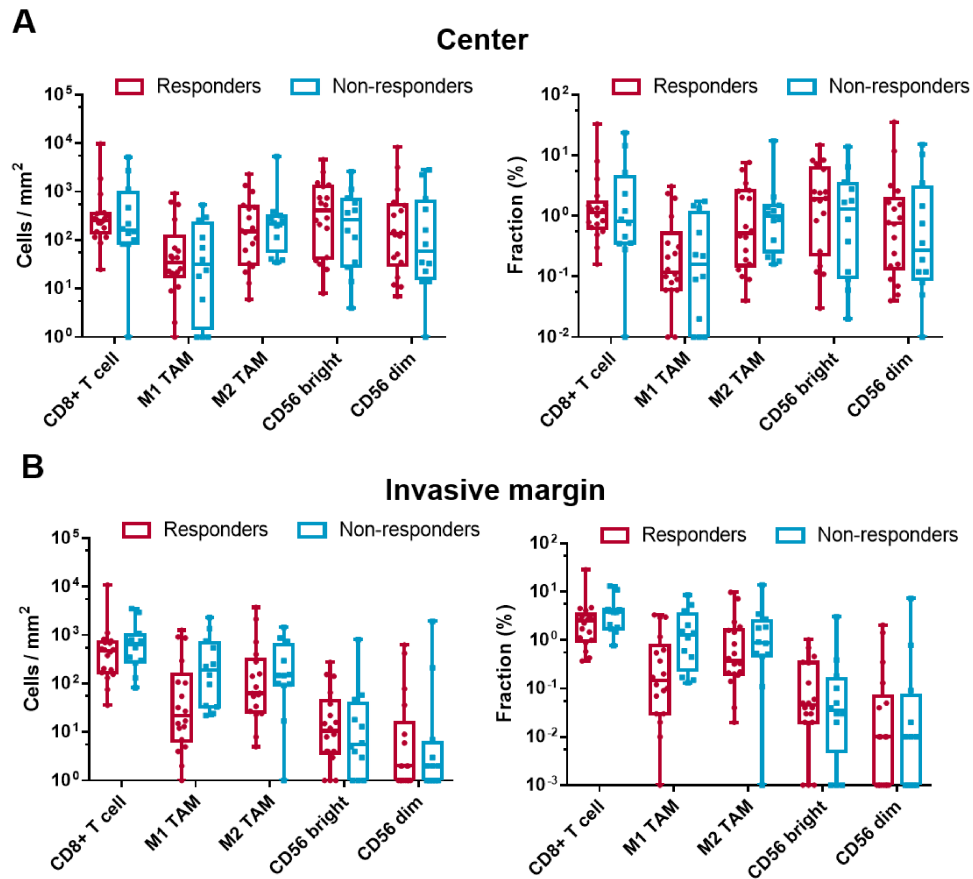
|                                | Overall responses | Median progression-free survival | Median overall survival |
|--------------------------------|-------------------|----------------------------------|-------------------------|
| <b>Tumor proportion score</b>  |                   |                                  |                         |
| <1%                            | 14/26 (53.8)      | 6.0 (4.2-7.1)                    | 11.9 (8.4-21.9)         |
| ≥1%                            | 4/5 (80)          | 9.0 (8.5-NR)                     | 17.8 (14.2-NR)          |
| Total                          | 18/31 (58.1)      | 6.1 (4.6-8.5)                    | 13.0 (9.1-21.0)         |
| <b>Immune proportion score</b> |                   |                                  |                         |
| <1%                            | 13/23 (56.5)      | 6.0 (4.2-7.1)                    | 11.1 (8.4-21.0)         |
| ≥1%                            | 5/8 (62.5)        | 8.7 (4.6-NR)                     | 19.9 (14.2-NR)          |
| Total                          | 18/31 (58.1)      | 6.1 (4.6-8.5)                    | 13.0 (9.1-21.0)         |
| <b>Tumor mutational burden</b> |                   |                                  |                         |
| Bottom 75%                     | 12/24 (50)        | 6.0 (4.3-9.0)                    | 11.4 (8.4-21.0)         |
| Top 25%                        | 6/10 (60)         | 6.1 (4.0-NR)                     | 13.1 (8.5-NR)           |
| Total                          | 18/34 (53)        | 6.0 (4.6-8.4)                    | 12.0 (9.1-17.8)         |
| <b>Blood mutational burden</b> |                   |                                  |                         |
| Bottom 75%                     | 13/22 (59.1)      | 6.4 (5.4-9.1)                    | 10.8 (7.6-19.5)         |
| Top 25%                        | 4/8 (50)          | 4.1 (2.4-NR)                     | 11.6 (8.5-NR)           |
| Total                          | 17/30 (56.7)      | 6.1 (4.3-8.4)                    | 10.8 (8.4-14.2)         |
| <b>Circulating tumor DNA</b>   |                   |                                  |                         |
| Positive at 8 weeks            | 7/17 (41.2)       | 4.3 (3.9-6.2)                    | 9.1 (7.6-NR)            |
| Negative at 8 weeks            | 10/13 (76.9)      | 7.3 (6.2-NR)                     | 13.0 (8.5-NR)           |
| Total                          | 17/30 (56.7)      | 5.7 (4.3-7.3)                    | 10.8 (8.0-14.2)         |

Data consists of number of overall responses/number of patients (%). NR, not reached.

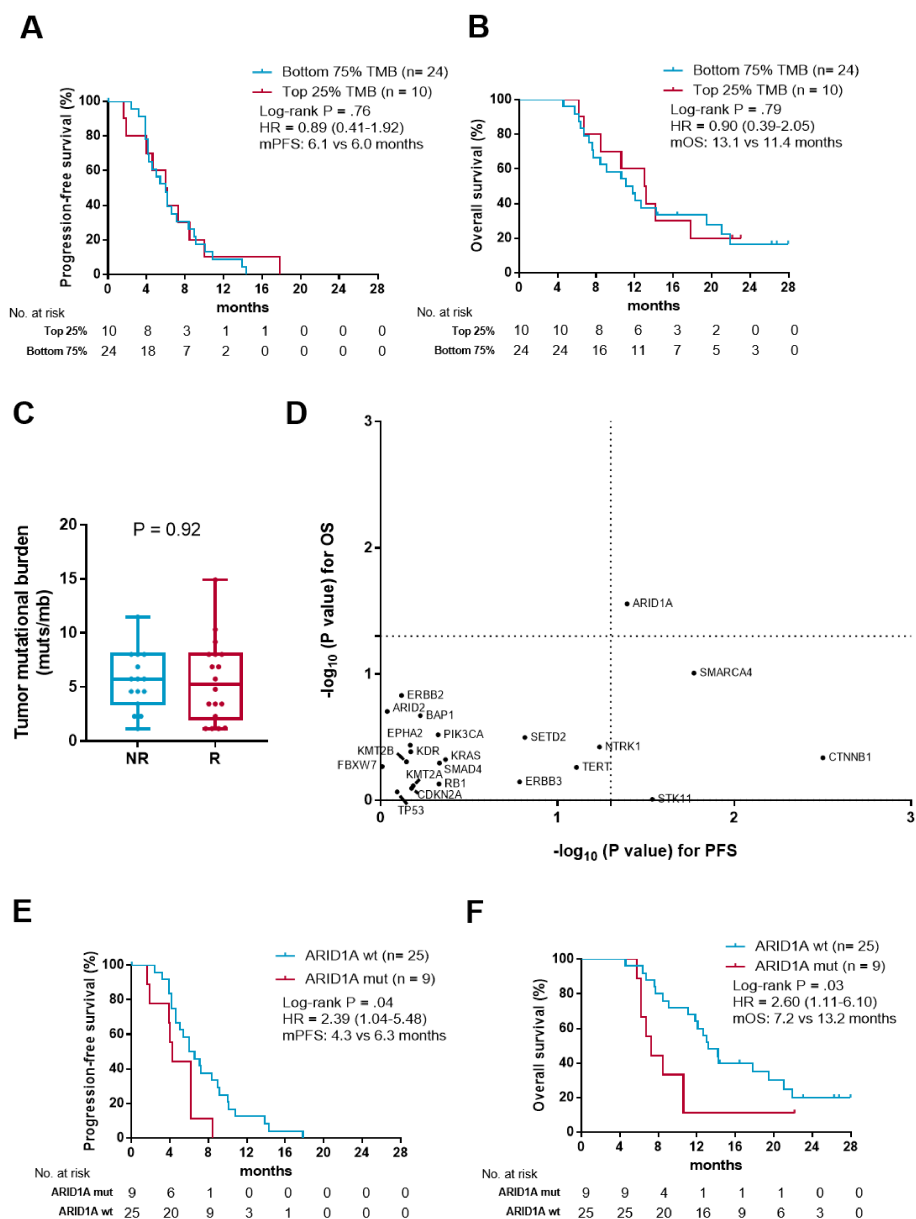
**Supplementary Table S2. Responses and survival by PD-L1 expression and tumor mutational burden**



**Supplementary Figure S1. Kaplan-Meier Estimates of Progression-Free Survival and Overall Survival by PD-L1 Expression Status.** (A) Kaplan-Meier survival curves of PFS comparing patients treated with camrelizumab plus GEMOX with PD-L1 tumor proportion scores of at least 1% and less than 1%. (B) Kaplan-Meier survival curves of OS comparing patients treated with camrelizumab plus GEMOX with PD-L1 tumor proportion scores of at least 1% and less than 1%. (C) Kaplan-Meier survival curves of PFS comparing patients treated with camrelizumab plus GEMOX with PD-L1 immune proportion scores of at least 1% and less than 1%. (D) Kaplan-Meier survival curves of OS comparing patients treated with camrelizumab plus GEMOX with PD-L1 immune proportion scores of at least 1% and less than 1%.

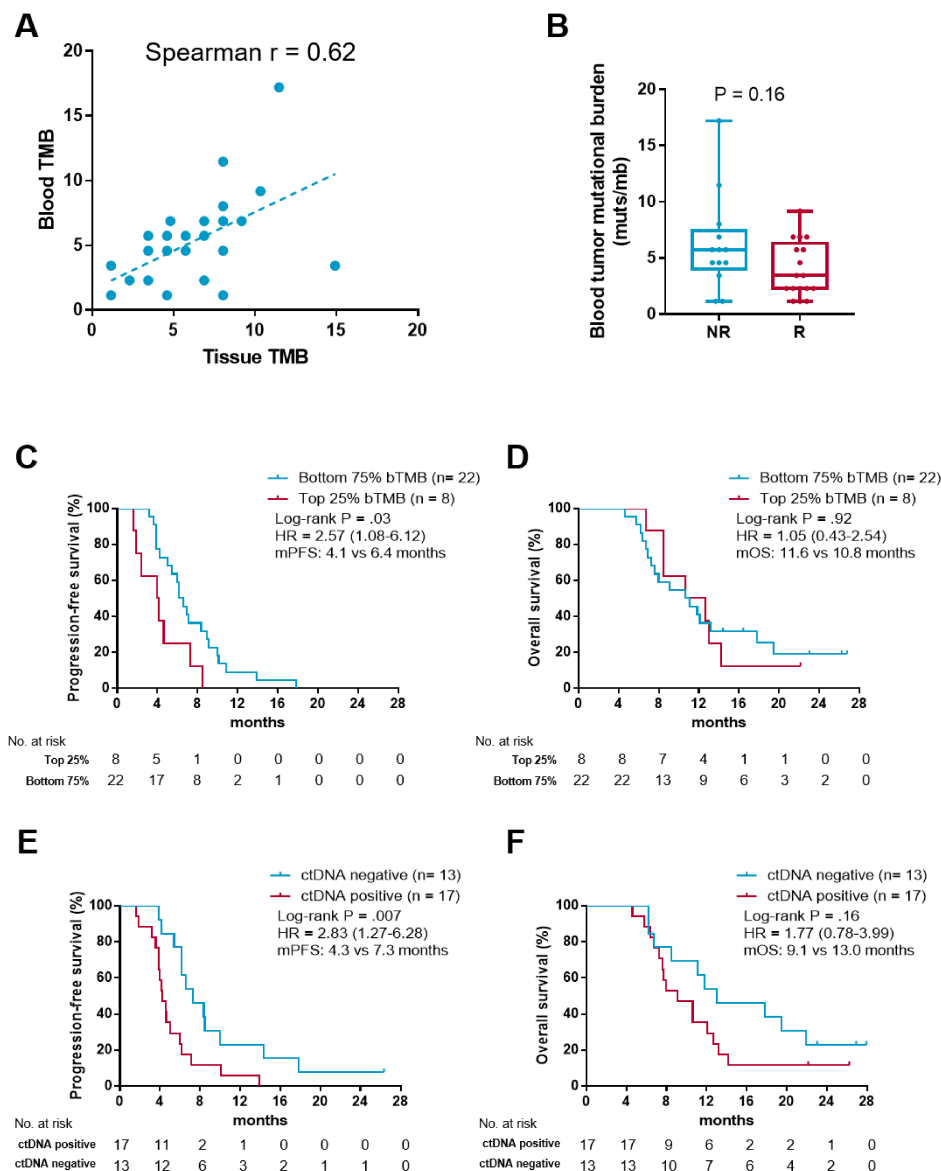


**Supplementary Figure S2. Immune cells in center or invasive margin between responders and non-responders.** (A) Comparison of immune cells in tumor center between responders and non-responders. (B) Comparisons of immune cells in invasive margin between responders and non-responders.



**Supplementary Figure S3. Kaplan-Meier Estimates of Progression-Free Survival and Overall Survival by TMB Status or gene mutation.** (A) Kaplan-Meier survival curves of PFS comparing patients treated with camrelizumab plus GEMOX with top 25% TMB and bottom 75% TMB. (B) Kaplan-Meier survival curves of OS comparing patients treated with camrelizumab plus GEMOX with top 25% TMB and bottom 75% TMB. (C) Comparison of TMB in responders and non-responders. (D) Comparisons of the association between individual altered genes and PFS or OS. (E)

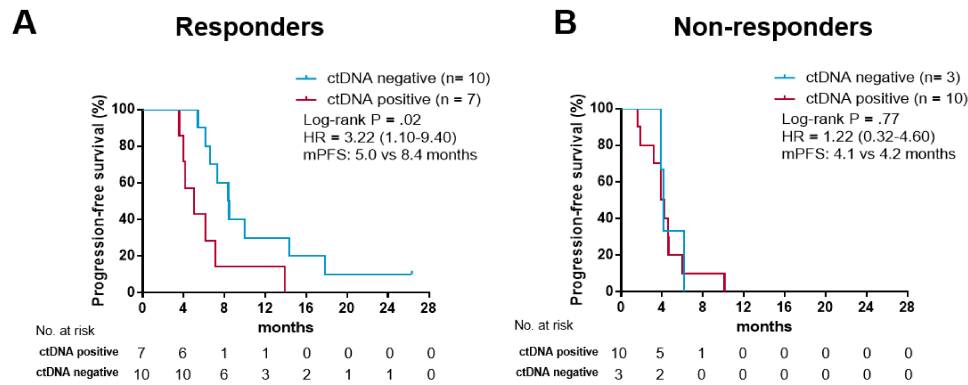
Kaplan-Meier survival curves of PFS comparing patients treated with camrelizumab plus GEMOX with or without ARID1A mutation. (F) Kaplan-Meier survival curves of OS comparing patients treated with camrelizumab plus GEMOX with or without ARID1A mutation.



**Supplementary Figure S4. The association between survival and ctDNA status or bTMB.** (A) The correlation between blood TMB and tissue TMB. (B) Comparison of bTMB between responders and non-responders. (C) Kaplan-Meier survival curves of PFS comparing patients treated with camrelizumab plus GEMOX with top 25% TMB and bottom 75% bTMB. (D) Kaplan-Meier survival curves of OS comparing patients treated with camrelizumab plus GEMOX with top 25% TMB and bottom 75% bTMB. (E) Kaplan-Meier survival curves of PFS comparing patients with positive post-treatment ctDNA and negative post-treatment ctDNA. (F) Kaplan-Meier survival



curves of OS comparing patients with positive post-treatment ctDNA and negative post-treatment ctDNA.



**Supplementary Figure S5.** The association between survival and ctDNA status in non-responders and responders. (A) Kaplan-Meier survival curves of PFS comparing patients with positive post-treatment ctDNA and negative post-treatment ctDNA in responders. (B) Kaplan-Meier survival curves of PFS comparing patients with positive post-treatment ctDNA and negative post-treatment ctDNA in non-responders.