



# Assessment of seroconversion after SARS-CoV2 vaccination in patients with lung cancer

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## Abstract

**Background:** SARS-CoV2 mortality rates are significantly higher in patients with lung cancer compared with the general population. However, little is known on their immunization status after vaccination. **Methods:** We obtained antibodies against SARS-CoV2 spike (S) protein from patients with lung cancer (Group A) both at baseline and at different time points after the first dose of SARS-CoV2 vaccine (two to three weeks [T1], six weeks  $\pm$  one week [T2], 12 weeks  $\pm$  three weeks [T3], and 24 weeks  $\pm$  three weeks [T4]). Antibodies were also acquired from a control cohort of non-lung cancer patients (Group B) as well as a third cohort containing healthy controls (Group C) at all time points and at T4, respectively. Analysis of antibody response at different time points, association with clinicopathologic parameters, and comparisons with control groups were performed. **Results:** A total of 125 patients with lung cancer were included in the analysis (96 males [74.3%], median age of 68 years [46-91]). All study participants received two vaccine doses (BNT162b2, mRNA-1273, AZD1222). Analysis of anti-SARS-CoV2 S protein titers showed minimal response at T1 (0.4 [0.4-48.6] IU/ml). Antibody response peaked at T2 (527.0 [0.4 – 2500] IU/ml) and declined over T3 (323.0 [0.4-2500] IU/ml) and T4 (141.0 [0.4-2500] IU/ml). Active smokers had lower antibody titers at T2 ( $p=0.04$ ), T3 ( $p=0.04$ ), and T4 ( $p<0.0001$ ) compared with former or never smokers. Peak antibody titers were not associated with any other clinicopathologic characteristic. No significant differences were observed compared with Group B. However, lung cancer patients group exhibited significantly decreased antibody titers compared with Group C at T4 ( $p<0.0001$ ). **Conclusions:** Lung cancer patients demonstrate sufficient antibody response six weeks after first dose of vaccine against SARS-CoV2 when vaccinated with two-dose vaccines. Rapidly declining antibody titers six weeks after first dose underline the need for a third dose three months later, in patients with lung cancer, and especially active smokers.

## Objectives

To prospectively evaluate the humoral response of patients with lung cancer through direct measurement of anti-S antibodies following vaccination against SARS-CoV-2.

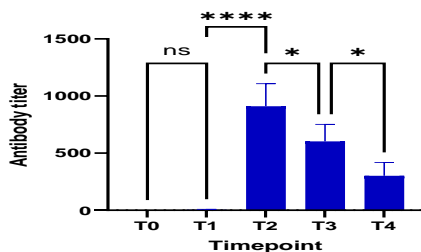
## Patients and methods

- **Group A:** Lung cancer patients; **Group B:** Patients with other malignancies; **Group C:** Healthy controls
- In vitro immunoassay for quantitative determination of anti-SARS-CoV2 S protein at different time points after first dose of vaccination
- Comparative analysis of seroconversion between the different groups; association with different baseline characteristics

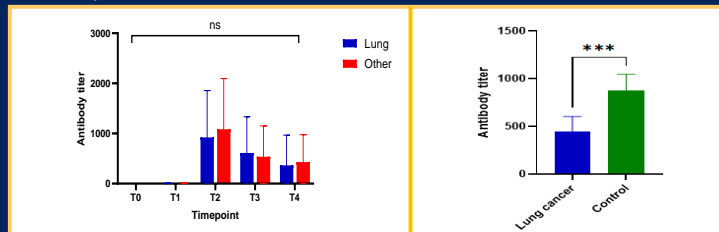
## Results

**Table 1/Figure 1.** Seroconversion at different time points for lung cancer patients

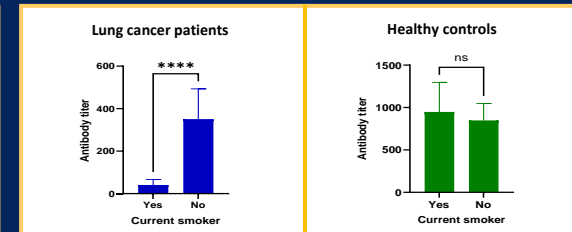
Time points (weeks)	Number of samples (%)	Median IU/ml (Range)
T0 (baseline)	28 (22.4)	0.4 (NA)
T1 (two to three)	41 (32.8)	0.4 (0.4-48.6)
T2 (six $\pm$ one)	41 (32.8)	527.0 (0.4-2500.0)
T3 (12 $\pm$ three)	93 (74.4)	323.0 (0.4-2500.0)
T4 (24 $\pm$ three)	73 (58.4)	141.0 (0.4-2500.0)



**Figure 2.** Seroconversion comparison between patients with lung cancer, other malignancy and healthy controls



**Figure 3.** Seroconversion comparison between active and former/never-smokers



## Conclusions

- Lung cancer patients achieve peak antibody response six weeks after first dose of vaccination; Antibody titers remain high, but gradually decline over a 24-week period after first vaccine dose
- Lung cancer patients, who are active smokers, present lower seroconversion compared with former or never smokers; This finding was not observed in healthy controls
- No other significant differences were observed with respect to other clinicopathologic characteristics
- Lung cancer patients show lower antibody response compared with the general population 24 weeks after first vaccine dose
- No significant differences in seroconversion are observed between patients with lung cancer and those with other solid tumors

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### Conflicts of interest

- The authors declare no conflicts of interest for this study
- Roche Diagnostics had no role in the design, execution, interpretation or writing of the study

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