

EP07.54: Adjuvant Thymosin Elevates Peripheral TERT-Positive Immune Cells in Stage I NSCLC: Interim Results of a Randomized Trial

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INTRODUCTION

Patients with stage I non-small cell lung cancer (NSCLC) remain at risk for recurrence and distant metastasis following curative surgical resection.¹ Perioperative surgical stress can induce peripheral immunosuppression and exacerbate immunosenescent phenotypes. Telomerase reverse transcriptase (TERT)-positive immune cells reflect cellular proliferative potential and may serve as a quantitative biomarker for immunosenescence.² This study was designed to evaluate the immunomodulatory impact of thymosin therapy following surgical resection for early-stage NSCLC.³

METHODS

Patients with pathologically confirmed stage I invasive lung adenocarcinoma (AJCC 8th edition), ECOG performance status 0-1, who underwent lobectomy with systematic lymph node dissection were enrolled. Patients were randomized into a treatment arm and control arm. The treatment arm received subcutaneous thymosin initiated one month after surgery, while the control arm underwent postoperative observation. Peripheral blood samples (4ml) were collected at three distinct time points: one day preoperatively (Pre), at one month after surgery (M1; prior to intervention), and at four months after surgery (M4; after 3 months of thymosin administration in the treatment arm). TERT-positive immune cells were quantified using an HSV1-hTERTp-GFP tool-virus assay and reported as GFP-positive immune cell counts. The results were defined as the absolute count of GFP-positive cells per 500,000 peripheral blood cells. The primary endpoint was the dynamic change in TERT-positive immune cells. Two-sided nonparametric tests were applied for between-group (Mann-Whitney U) comparisons.

DISCUSSION AND CONCLUSION

- Interim findings suggest that postoperative thymosin may elevate peripheral TERT-positive immune cell levels in stage I NSCLC, highlighting its potential to alleviate immunosenescence.
- Further expansion of the sample size, coupled with longitudinal follow-up for recurrence, metastasis, and survival, is warranted to validate clinical benefit and the predictive value of this biomarker.

REFERENCES & ACKNOWLEDGEMENTS

References:

- Al Bakir M, et al. Nature. 2023;616(7957): 534-542.
- Zhang Q, et al. Mol Biomed. 2025;6(1): 146.
- Guo CL, et al. Chin Med J (Engl). 2021;134(22): 2700-2709.

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RESULTS

As shown in Figure1, TERT⁺ cell counts were determined at baseline and M4, and M4/Pre fold-change, in thymosin-treated vs control NSCLC patients. Peripheral blood cells were infected with hSFTPp-HSV1-hTERTp-GFP reporter virus, cultured for 24 h, and stained with anti-CD45. Flow cytometry quantified GFP⁺ cells within CD45⁺ (immune) and CD45⁻ (CTC) fractions.

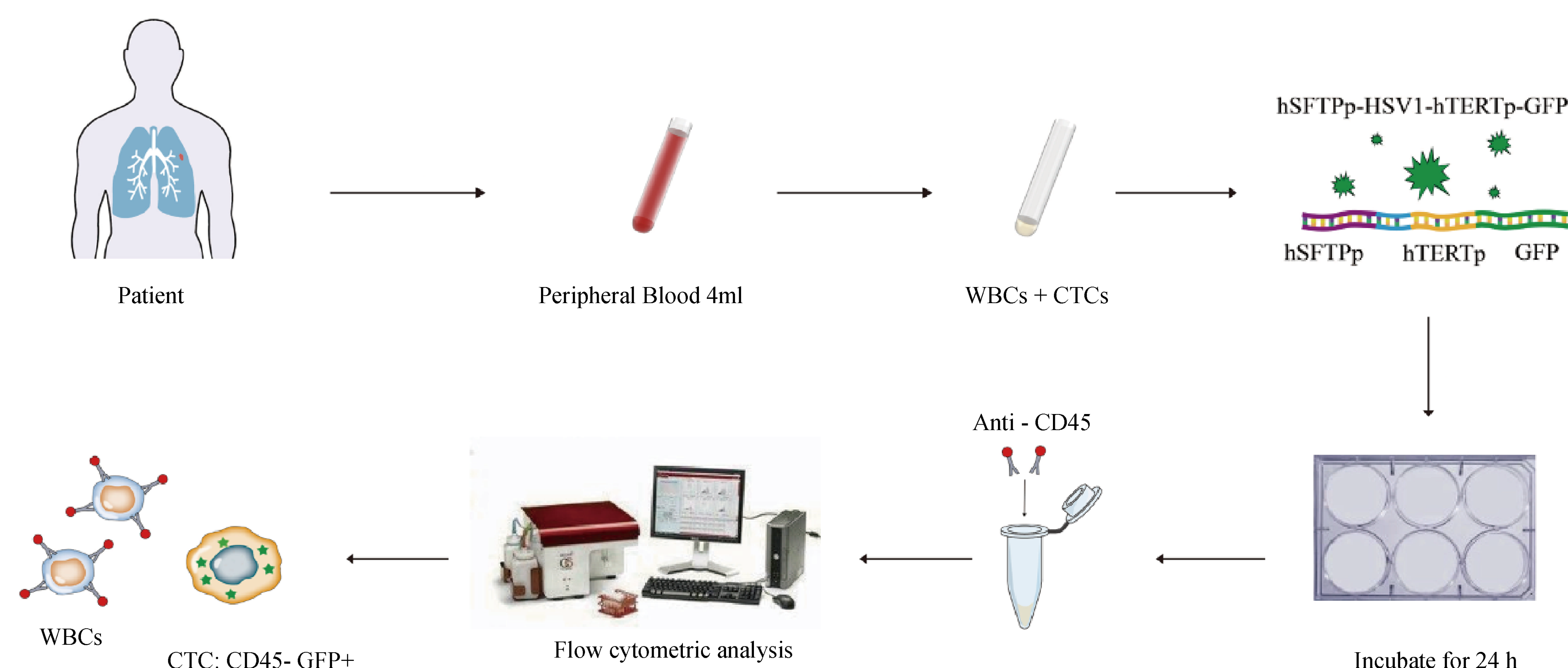


Figure 1. Flowchart of TERT⁺ immune cell testing in patients

Thirty-three patients were enrolled (Treatment, n=18; Controlled, n=15). Preoperative baseline TERT-positive immune cell counts were comparable between groups (median [IQR] 180.0 [48.5–283.8] vs 165.0 [55.0–290.0]). At M4, the treatment arm showed higher TERT-positive immune cell counts than controlled arm (197.5 [117.5–358.8] vs 155.0 [62.5–187.5]; p = 0.061), indicating a favorable trend. When expressed as fold-change from preoperative baseline, the treatment arm demonstrated a higher M4/pre ratio (median 1.36 vs 0.81; p = 0.036). Inter-individual variability was substantial and intra-group paired comparisons did not reach statistical significance in this interim analysis.