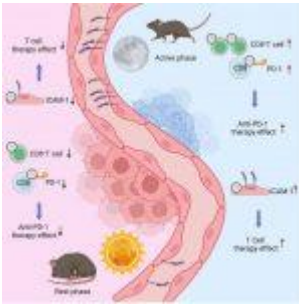
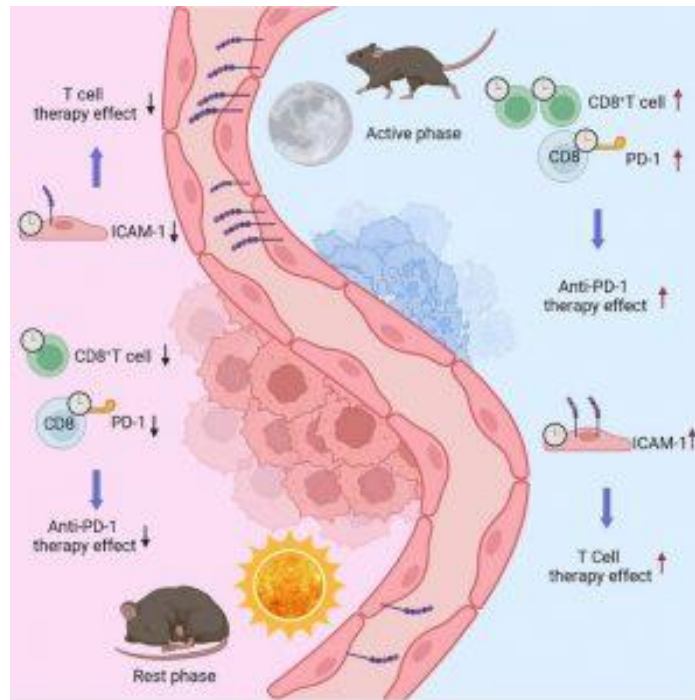


# Circadian tumor infiltration and function of CD8+ T cells dictate immunotherapy efficacy



In a recent study, researchers investigated the circadian regulation of CD8+ T cells and its implications for cancer [immunotherapy](#) efficacy (Figure 1). It highlights that both the quantity and quality of tumor-infiltrating lymphocytes (TILs), particularly CD8+ T cells, exhibit circadian oscillations. These oscillations are driven by the intrinsic circadian clocks of the leukocytes and the rhythmic expression of adhesion molecules on endothelial cells, which facilitate leukocyte infiltration.



**Figure 1: Graphical abstract.**

The research utilized murine models and human cancer samples to demonstrate the time-of-day-dependent variations in TILs. The findings suggest that the [efficacy of immunotherapy](#), including CAR T cell therapy and immune checkpoint blockade, could be significantly influenced by the timing of treatment administration. Specifically, administering these therapies at times when CD8+ T cell infiltration and function are at their peak may enhance their effectiveness.

## Key Takeaways

### 1. Circadian Regulation of CD8+ T Cells:

- CD8+ T cells have intrinsic circadian clocks that regulate their infiltration into tumors and their antitumor activities.
- These circadian rhythms affect the expression of key molecules involved in T cell trafficking and adhesion, such as ICAM-1.

### 2. Impact on Immunotherapy:

- The timing of immunotherapy administration can influence treatment outcomes due to the circadian variation in TIL infiltration and function.

- Optimizing the timing of treatments like CAR T cell therapy and immune checkpoint inhibitors could enhance their efficacy.

### 3. Murine and Human Cancer Models:

- The study's findings were consistent across both murine models and human cancer samples, underscoring the relevance of circadian rhythms in clinical settings.

### 4. Clinical Implications:

- The research suggests the potential for chronotherapy in cancer treatment, where therapies are timed to align with the body's biological rhythms to maximize effectiveness.
- Further clinical studies are needed to determine the optimal timing for different types of immunotherapy based on circadian rhythms.

### 5. Future Directions:

- Investigating other immune cell types and their circadian regulation in the tumor microenvironment.
- Exploring the molecular mechanisms underlying circadian control of immune cell functions.
- Developing guidelines for the timing of immunotherapy administration to improve patient outcomes.

## Conclusion

This study provides crucial insights into the circadian regulation of CD8+ T cells and its impact on cancer immunotherapy efficacy. By understanding the temporal dynamics of immune cell function, clinicians can potentially [enhance the success](#) of immunotherapy treatments through chronotherapy. Further research in this area could lead to more personalized and effective [cancer treatment](#) strategies.

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infiltration and function of CD8<sup>+</sup> T cells dictate immunotherapy efficacy. Cell.

*Summary by Gaurang Telang*