## Condensed version and key points from the study:

# Hydrogen gas restores exhausted CD8+ T cells in patients with advanced colorectal cancer to improve prognosis

**Study Overview**

- A randomized controlled trial investigating whether hydrogen gas inhalation could restore exhausted CD8+ T cells and improve prognosis in patients with stage IV colorectal cancer. Conducted at Tamana Regional Health Medical Center in Kumamoto, Japan, enrolling 55 patients between July 2014 and July 2017.

**Background — Why CD8+ T Cells Matter**

- **Exhausted CD8+ T cells lose their immunological activity due to mitochondrial dysfunction** caused by the inactivation of a protein called PGC-1α, and this exhaustion is linked to a poor cancer prognosis. In simple terms, these are the immune cells that fight cancer — when they "burn out," the cancer has less resistance.
- Hydrogen gas was recently reported to activate PGC-1α, suggesting it could potentially revive these exhausted immune cells.

**How the Intervention Worked**

- Patients inhaled hydrogen gas for 3 hours per day at home while also receiving chemotherapy at the medical centre.
- CD8+ T cells were isolated from the peripheral blood and their characteristics were analyzed using flow cytometry.

## Condensed version and key points from the study:

# Hydrogen gas restores exhausted CD8+ T cells in patients with advanced colorectal cancer to improve prognosis

**Key Results**

- Exhausted terminal PD-1+ CD8+ T cells in the peripheral blood were independently associated with worse progression-free survival (PFS) and overall survival (OS). (PD-1 is a marker of immune exhaustion.)
- Hydrogen gas decreased the proportion of exhausted terminal PD-1+ CD8+ T cells, increased that of active terminal PD-1− CD8+ T cells, and improved both PFS and OS times.
- The balance between terminal PD-1+ and PD-1− CD8+ T cells was found to be critical for cancer prognosis.

**A Novel Patient Classification System**

- Based on these two immune cell indices, the researchers developed a new patient classification system (categories 1–4) to help predict prognosis and therapeutic response. This is a potentially significant contribution beyond hydrogen therapy itself.

**Conclusions**

- The results suggest that hydrogen gas reverses the imbalance toward exhausted PD-1+ CD8+ T cells, providing an improved prognosis in advanced colorectal cancer patients.

Why This Study Stands Out This is notably different from the previous studies because it goes beyond symptom relief or liver protection — it proposes a direct immune mechanism by which hydrogen may actively help the body fight cancer, not just reduce treatment side effects.

PubMed

To Read The Full Study Please

CLICK HERE