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# Assessing the Efficacy of donor-derived cell-free DNA (ddcfDNA) Measurement in Liver Transplant Recipients for Rejection Diagnosis and Therapeutic Response Evaluation : A case report

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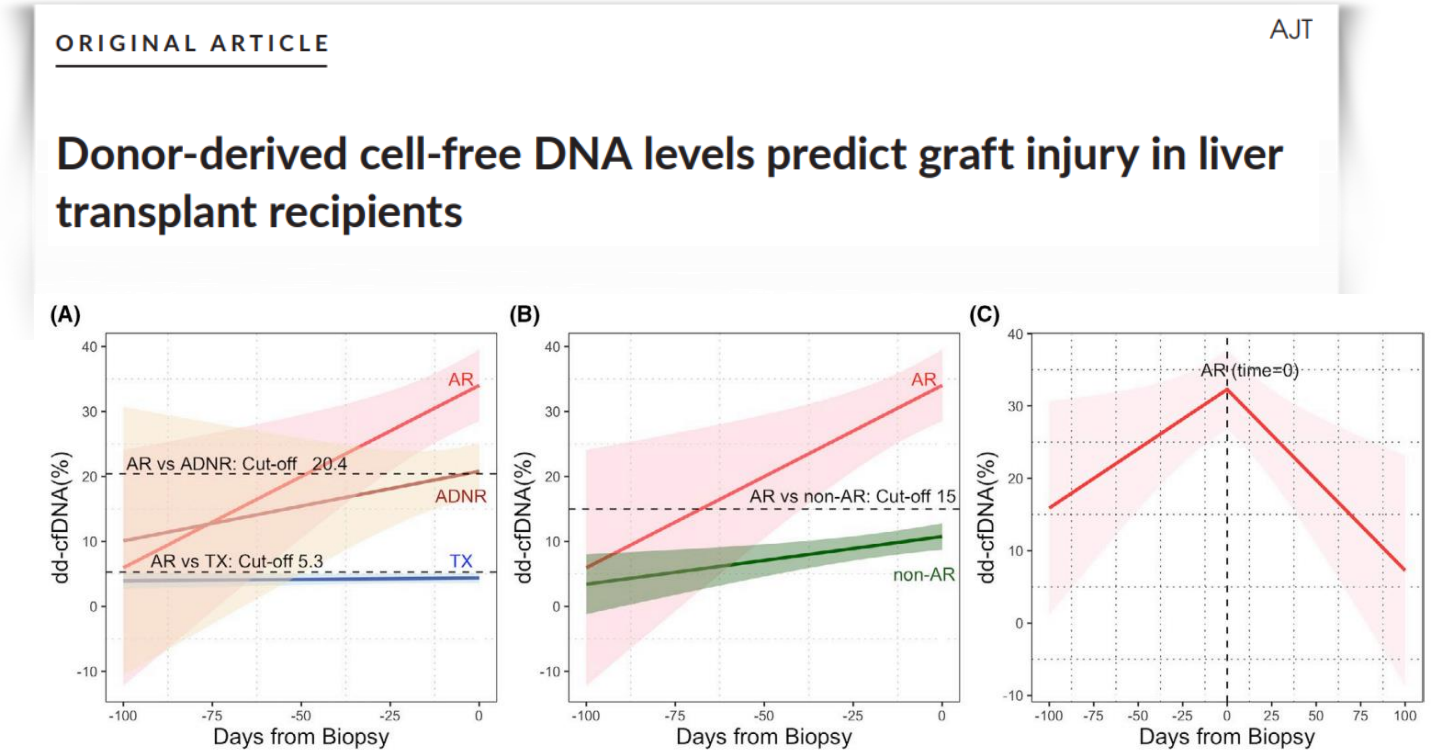
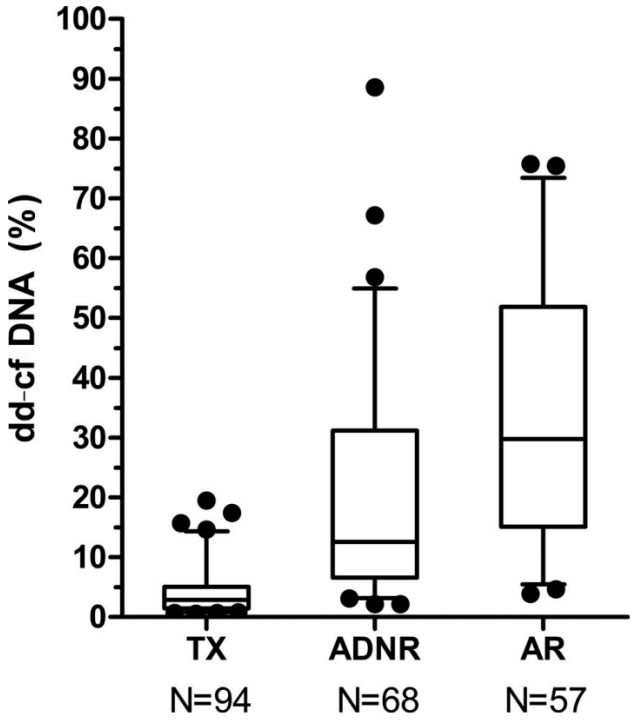
# Background

The emergence of circulating biomarkers, particularly **donor-derived cell-free DNA (ddcfDNA)**, presents a promising **non-invasive approach for rejection diagnosis** and therapeutic monitoring.

*Am J Transplant. 2022;22:532–540*

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# Background



The clinical utility of ddcfDNA measurement has been validated in an increasing number of studies.

PLOS MEDICINE

RESEARCH ARTICLE

Graft-derived cell-free DNA, a noninvasive early rejection and graft damage marker in liver transplantation: A prospective, observational, multicenter cohort study

*PLoS Med. 2017 Apr; 14(4): e1002286.*

ORIGINAL ARTICLE

Hepatology Research

**Noninvasive graft monitoring using donor-derived cell-free DNA in Japanese liver transplantation**

*Hepatol Res. 2024 Mar;54(3):300-314.*

CASE REPORT

AJT

**High levels of donor-derived cell-free DNA in a case of graft-versus-host-disease following liver transplantation**

*Am J Transplant. 2022 Mar;22(3):973-976.*

ORIGINAL ARTICLE

AASLD

**Elevated fractional donor-derived cell-free DNA during subclinical graft injury after liver transplantation**

*Liver Transpl. 2022 Dec;28(12):1911-1919..*

# Background



- ✓ ddcfDNA, which is released into the blood stream by necrotic and apoptotic cells, is a promising **noninvasive organ integrity biomarker**.
- ✓ In liver transplantation (LT), neither conventional liver function tests nor immunosuppressive drug monitoring are very effective for rejection monitoring.
- ✓ This case report explores the **feasibility and potential benefits of ddcfDNA measurement** into clinical practice for LT recipients.

# Case presentation



- 45-year-old male patient
- About 200 days after deceased-donor LT for alcoholic liver cirrhosis
- His liver function has been well maintained during the post-transplant follow-up

- On regular follow-up day, he complained of itching sensation, and patient reported that he had skipped his immunosuppressant medication while traveling the week before.

- We anticipated acute rejection and planned a **liver biopsy and ddcfDNA** measurement. After the **rejection was confirmed by liver biopsy**, we proceeded steroid pulse therapy (SPT).

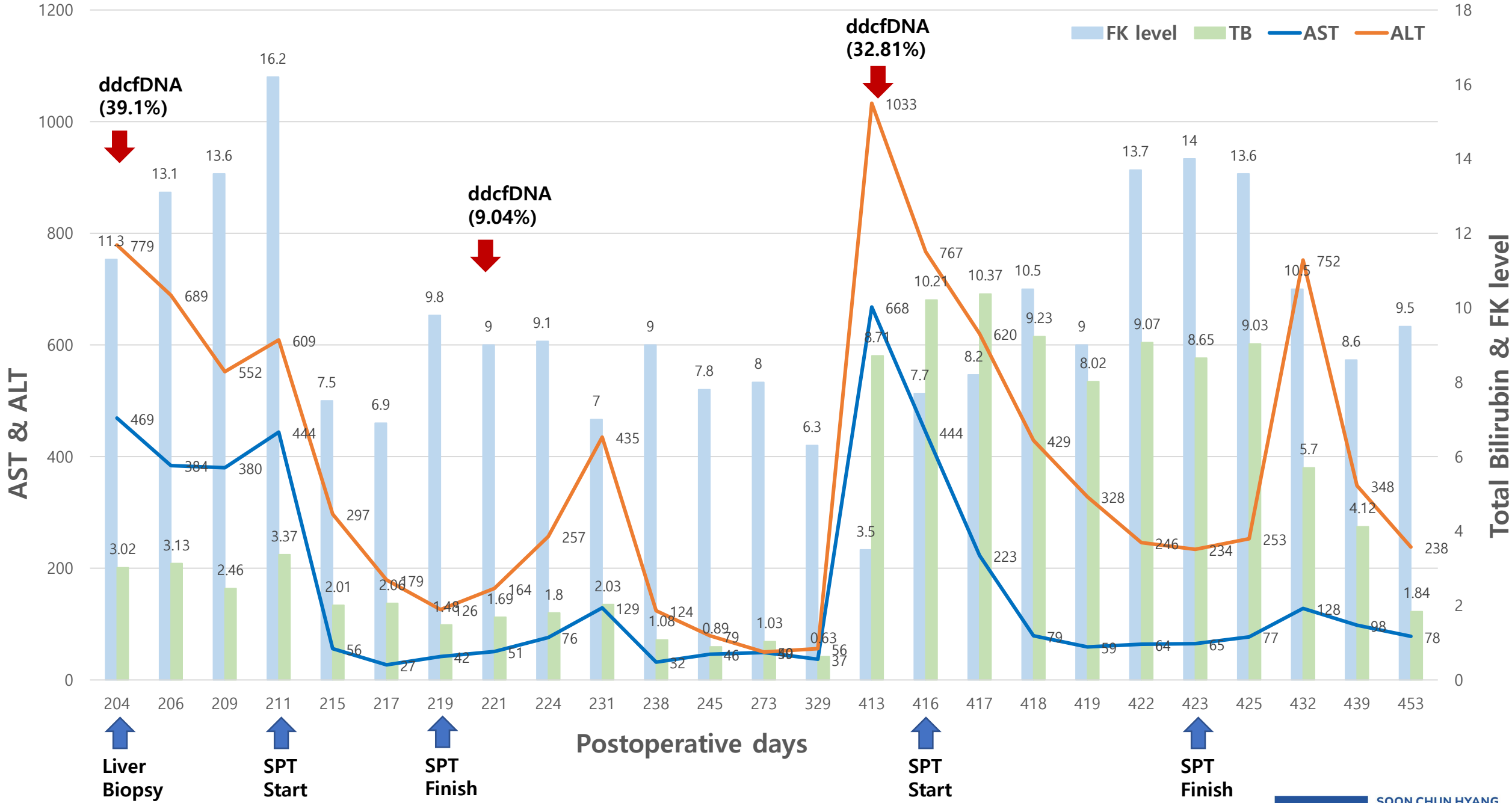
# Case presentation



- We check absolute **number of ddcfDNA copies per mL of plasma and fraction of ddcfDNA (ddcfDNA%)** and the result was **39.1%**. And second serum ddcfDNA sample was collected after SPT, the result was **9.01%**.

- Following the initial episode of rejection, the patient discontinued immunosuppressive medication for a period due to similar reasons, which resulted in **elevated liver enzyme levels once again**. This time, **only ddcfDNA was measured without liver biopsy** and SPT was administered.

- During the second rejection episode, the ddcfDNA level was measured at **32.81%**. The patient rejected further ddcfDNA measurement due to the improvement in liver enzyme levels following SPT.

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# Conclusions



- ✓ ddcfDNA serves as a sensitive biomarker for detecting graft injuries in liver transplant recipients in this case.
- ✓ This biomarker may help detect early signs of graft injury and rejection to inform liver transplant recipients management strategies (etc. without liver biopsy).
- ✓ Further large-scale research will be needed to establish the practical value of ddcfDNA measurements in the management of liver transplant recipients.