

2026 第8回日本メディカルAI学会学術集会
イブニングセミナー Evening Seminar 1
2026/06/05 (Fri) 16:20-17:20 Hall A

Title : **Application of AI
in non-invasive diagnostic technologies**

Chair : **Mr. DH Park**
Senior Manager, Market Development
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Speaker : **Prof. Allen Chan**
Department of Chemical Pathology
The Chinese University of Hong Kong



Prof. Allen Chan

The analysis of plasma DNA has transformed the landscape of medical diagnostics. By detecting the over-representation of chromosome 21 sequences in the plasma DNA of pregnant women, we demonstrated that fetal Down syndrome can be detected noninvasively with an overall accuracy exceeding 99%. Owing to its combination of safety, scalability, and diagnostic performance, this approach has been rapidly adopted worldwide, with more than 10 million tests now performed each year.

The same conceptual framework has since been extended to cancer diagnostics. However, cancer presents a substantially greater analytical challenge because malignant disease is characterized by highly heterogeneous genomic and epigenomic alterations. As a result, current approaches that rely primarily on predefined cancer-associated changes have achieved only limited diagnostic accuracy, particularly in early-stage disease.

In this lecture, I will discuss how AI-based analytical strategies can open new possibilities for plasma DNA diagnostics by identifying complex, multidimensional molecular patterns that are difficult to capture using conventional rule-based approaches. I will also describe how we have applied AI to transform a third-generation sequencing platform, enabling the direct identification of DNA methylation without bisulfite conversion. Together, these advances illustrate how the integration of plasma DNA analysis, advanced sequencing technologies, and artificial intelligence may reshape the future of precision diagnostics.



PacBio Vega system