varsomeclinical

A CLINICAL CASE STUDY

Development of an NGS solution in hematological malignancies at Versailles Hospital, France

CENTRE HOSPITALIER DE VERSAILLES
CHV

CONTENTS

Site overview

Versailles Hospital (VH) is the reference facility of the Yvelines Sud Regional Hospital Group (GHT) and hosts the only hematological intensive care unit within the network. The GHT brings together nine public hospitals and serves a population of approximately 750,000 patients. VH operates under shared governance with four of these hospitals (Figure 1).

The hospital (VH) is spread across three sites, including André Mignot Hospital (AMH), home to the Department of Biology. The department includes three molecular laboratories—hematology, genetics, and microbiology—that have shared an Illumina MiSeq sequencer since 2023. As the only Next Generation Sequencing (NGS)-equipped site within the GHT, VH receives samples from multiple healthcare centers across the region. The molecular hematology team at AMH consists of two clinical biologists, one molecular engineer, and four laboratory technicians.

Figure 1. GHT network

Figure 2. André Mignot Hospital

From left to right : Jennifer OSMAN (pharmD, medical Biologist) ; Sara CHIKHI (pharmD, medical Biologist) ; Papa-Mze NASSERDINE (phD, engineer) ; lab technician team : Céline QUERE, Alexandre BOISSONNOT, Valéry GENOIS and Virgine THERY.

Figure 3. Molecular hematobiology team of Versailles Hospital, France

A scalable NGS workflow for onco-hematology

With the expansion of international recommendations since 2022, Next Generation Sequencing has become essential for a growing number of hematological malignancies. To address these evolving needs, the AMH hematobiology team implemented a streamlined, high-performance NGS workflow supporting multiple onco-hematology applications.

Designed by Dr. Jennifer Osman, PharmD, the workflow follows four key steps: ① DNA extraction, ② library preparation and target enrichment, ③ sequencing, and ④ data analysis.

Following a competitive evaluation, Agilent Technologies was selected for library preparation and target enrichment. The solution stood out for its flexibility, automation-ready ecosystem, and cost-effectiveness.

For bioinformatics analysis, VarSome Clinical (Saphetor) was chosen for its European Union In Vitro Diagnostic Regulation (IVDR) and General Data Protection Regulation (GDPR) compliance, GRCh38 reference genome support, somatic analysis capabilities, sensitivity for low VAF variants detection, freedom of evolution of the pipeline, intuitive interface, and responsive customer support.

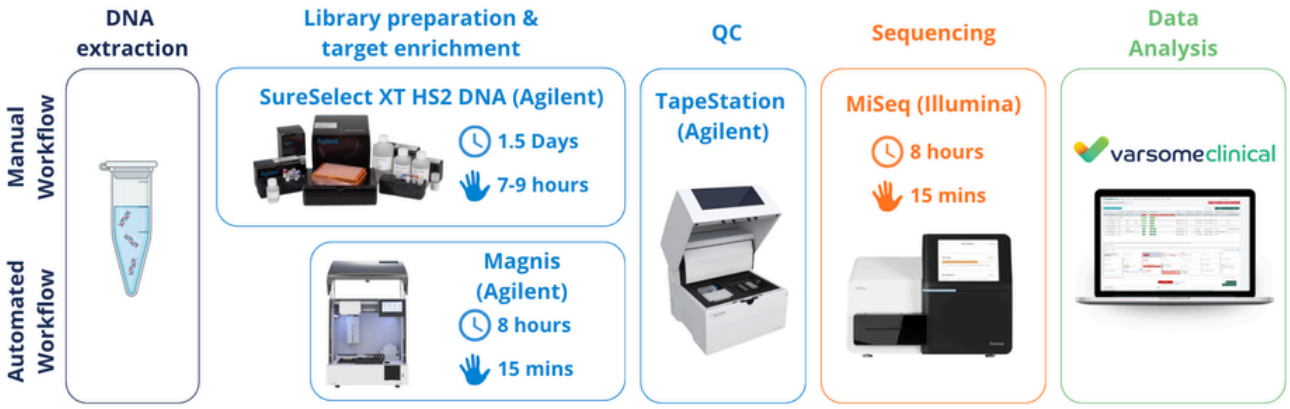

Figure 4. NGS Workflow at Versailles hospital: ◷ total time of the step; ✋ time of hand technique; QC: Quality Control

A customized panel designed for clinical impact

The AMH workflow is built around a unique, in-house NGS panel targeting genes involved in hematological malignancies. Developed in collaboration with Agilent (panel design and manufacturing) and VarSome (pipeline development), this panel has been continuously optimized. It has already undergone five updates, expanding its gene content to address a broader range of clinical indications.

Today, the panel is routinely used for myeloid and lymphoid malignancies, as well as for the detection of drug resistance mechanisms.

From manual to automated: increasing efficiency without compromise

Initially, library preparation was performed manually using the Agilent SureSelect XT HS2 DNA* protocol, with quality controls assessed before and after target capture on the Agilent 4150 TapeStation system*. While this approach allowed high-throughput processing and skill development, it required significant hands-on time and highly trained personnel.

To support rising sample volumes, the AMH team transitioned to the Agilent MagnisDx NGS prep system**, an automation platform. MagnisDx delivers a fully automated NGS library preparation workflow using the same Agilent SureSelect XT HS2 reagents*, provided pre-aliquoted and ready to use. With only 15 minutes of hands-on time and overnight operation, the system produces highly reproducible results comparable to manual preparation.

Although MagnisDx processes eight samples per run, multiple weekly runs enable efficient pooling for multiplex sequencing on the Illumina MiSeq system.

Confident variant interpretation with VarSome Clinical

The FASTQ files obtained from sequencing are then analyzed using VarSome Clinical. The VarSome team initially adapted the pipeline for use with somatic samples, in targeted mode, aligned with the GRCh38 reference genome. The IVDR-certified platform calls and annotates variants, providing a transparent classification based on the ACMG and AMP framework, showing how each criterion has been applied. This facilitates a quick review of results by clinical biologists and consistent reporting standards.

VarSome Clinical integrates data from more than 140 data sources, including ClinVar, gnomAD, iARC, OncoKB™, the Clinical Knowledgebase (CKB), and COSMIC, providing an extensive field of knowledge on variant pathogenicity. This reduces the need to consult multiple external tools during interpretation. For the VH team, this centralized environment makes it possible to manage higher sample volumes and to maintain variant workflows tailored to each clinical indication. The close collaboration with VarSome and ease of use of the platform also supported the iterative development of their in-house panel, allowing rapid alignment between updates to panel content and updates to the analysis pipeline.

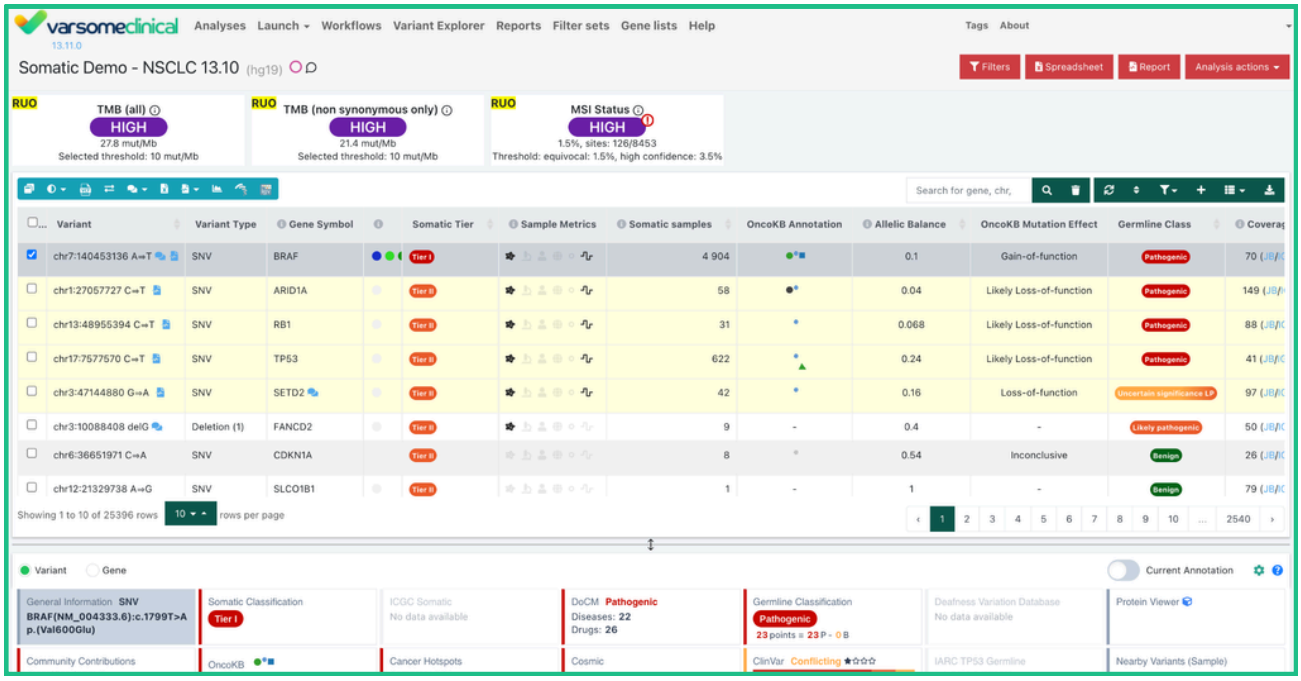

Figure 5. Screenshot of the VarSome Clinical User Interface

A successful partnership driving clinical excellence

Through the combined strengths of Agilent and VarSome solutions, the AMH molecular hematology team delivers high-quality NGS results with turnaround times ranging from 3 to 21 days, depending on clinical urgency. This integrated approach has enabled the laboratory to expand testing indications, increase throughput, and support clinicians with reliable, actionable molecular insights.

All claims surrounding performance of Agilent SureSelect XT HS2 and Agilent 4150 TapeStation products are those solely owned by Versailles Hospital. Agilent has not verified these claims.

** Agilent SureSelect XT HS2 DNA reagents and Agilent 4150 TapeStation system - For Research Use Only. Not for use in diagnostic procedures.*

*** For In Vitro Diagnostic Use.*

References

1. Dimopoulos MA, Terpos E, Boccadoro M, et al. EHA–EMN Evidence-Based Guidelines for diagnosis, treatment and follow-up of patients with multiple myeloma. *Nat Rev Clin Oncol.* 2025;22(9):680-700. doi:10.1038/s41571-025-01041-x
2. Döhner H, Wei AH, Appelbaum FR, et al. Diagnosis and management of AML in adults: 2022 recommendations from an international expert panel on behalf of the ELN. *Blood.* 2022;140(12):1345-1377. doi:10.1182/blood.2022016867
3. Khoury JD, Solary E, Abla O, et al. The 5th edition of the World Health Organization Classification of Haematolymphoid Tumours: Myeloid and Histiocytic/Dendritic Neoplasms. *Leukemia.* 2022;36(7):1703-1719. doi:10.1038/s41375-022-01613-1

VSC-WP005-V01

Built with Swiss precision by

EPFL Innovation Park - C
1015 Lausanne, Switzerland