

Genomic DNA Analysis of Cervical Smear Samples of Endometrial Cancer with Next-Generation Sequencing: A Prospective Study

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Backgrounds

- Conventional methods for early diagnosis and predict prognosis in endometrial cancer had limitations.
- Cervical smear samples are easily obtainable and may effectively reflect the tumor microenvironment in gynecological cancers.
- Therefore, we investigated the genomic DNA analysis of cervical smear samples with next-generation sequencing.

Methods

- Patients who underwent endometrial surgery were prospectively enrolled since January 2021.
- Cervical smear samples and blood samples were obtained simultaneously.
- Tumor genomic DNA and cell-free DNA were extracted and analyzed with a custom panel that covers 100 endometrial cancer-related genes (Dxome).
- Prepared libraries were sequenced using NovaSeq 6000 System (Illumina) and analyzed using PiSeq analysis (Dxome).

Results

- Cervical smear samples were obtained from 113 patients, including 94 cancer patients.
- Cervical swab-based genomic DNA detected cancer with a sensitivity of 67% and specificity of 95% (Table 1).
- Genomic landscape analysis identified the most frequently altered genes (Figure 1).
- There were co-occurring genes and mutually exclusive genes (Figure 2).
- 63 patients were classified according to the Proactive Molecular Risk Classifier for Endometrial Cancer (ProMisE). (Figure 3).

Conclusion

- Cervical swab-based gDNA showed moderate sensitivity and high specificity.
- Furthermore, it allowed patients to be classified according to ProMisE classification, having both predictive and prognostic implications.

COI and funding statement

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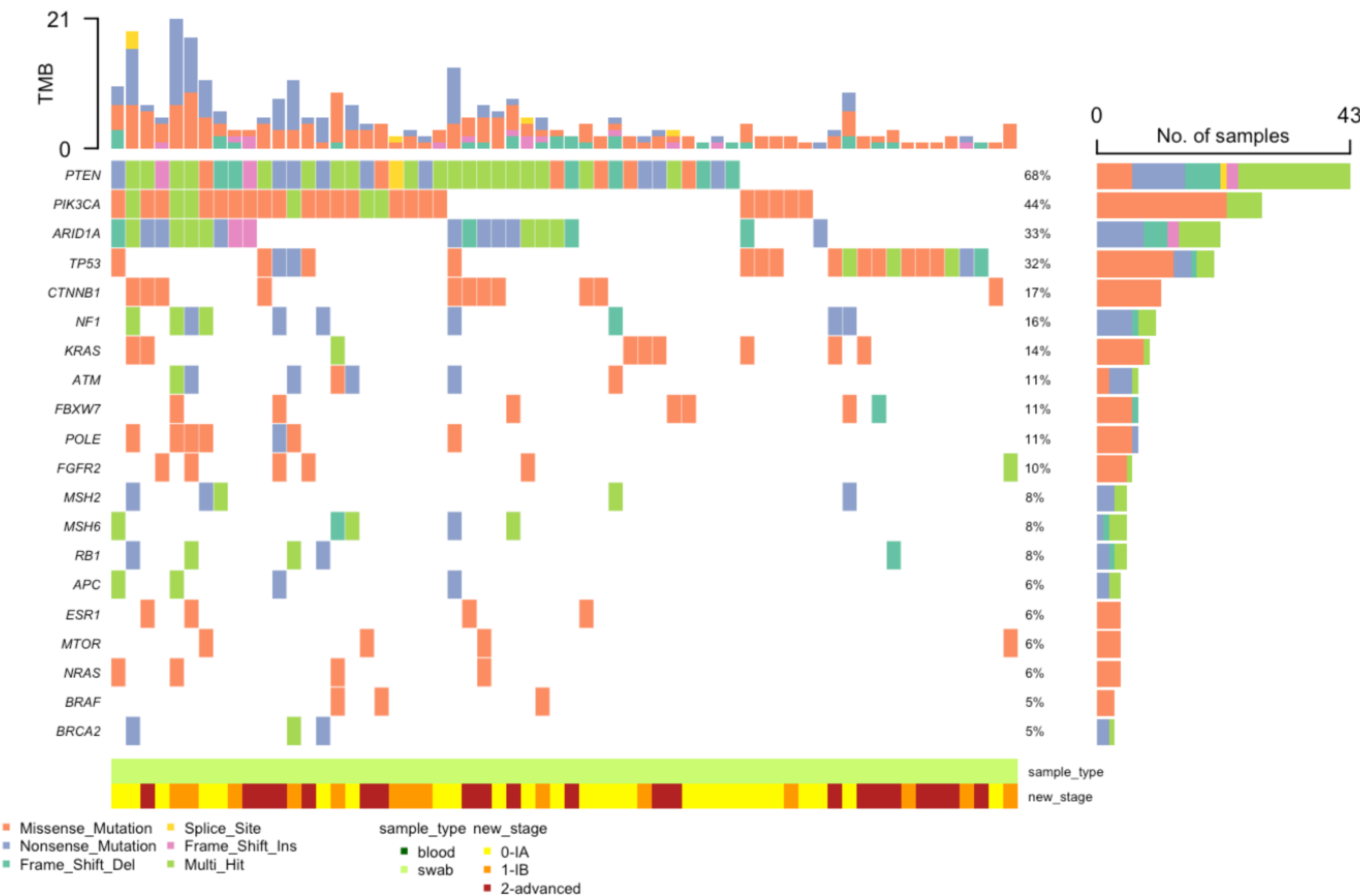


Figure 1. Genomic analysis of somatic pathogenic mutations from cervical swab-based genomic DNA

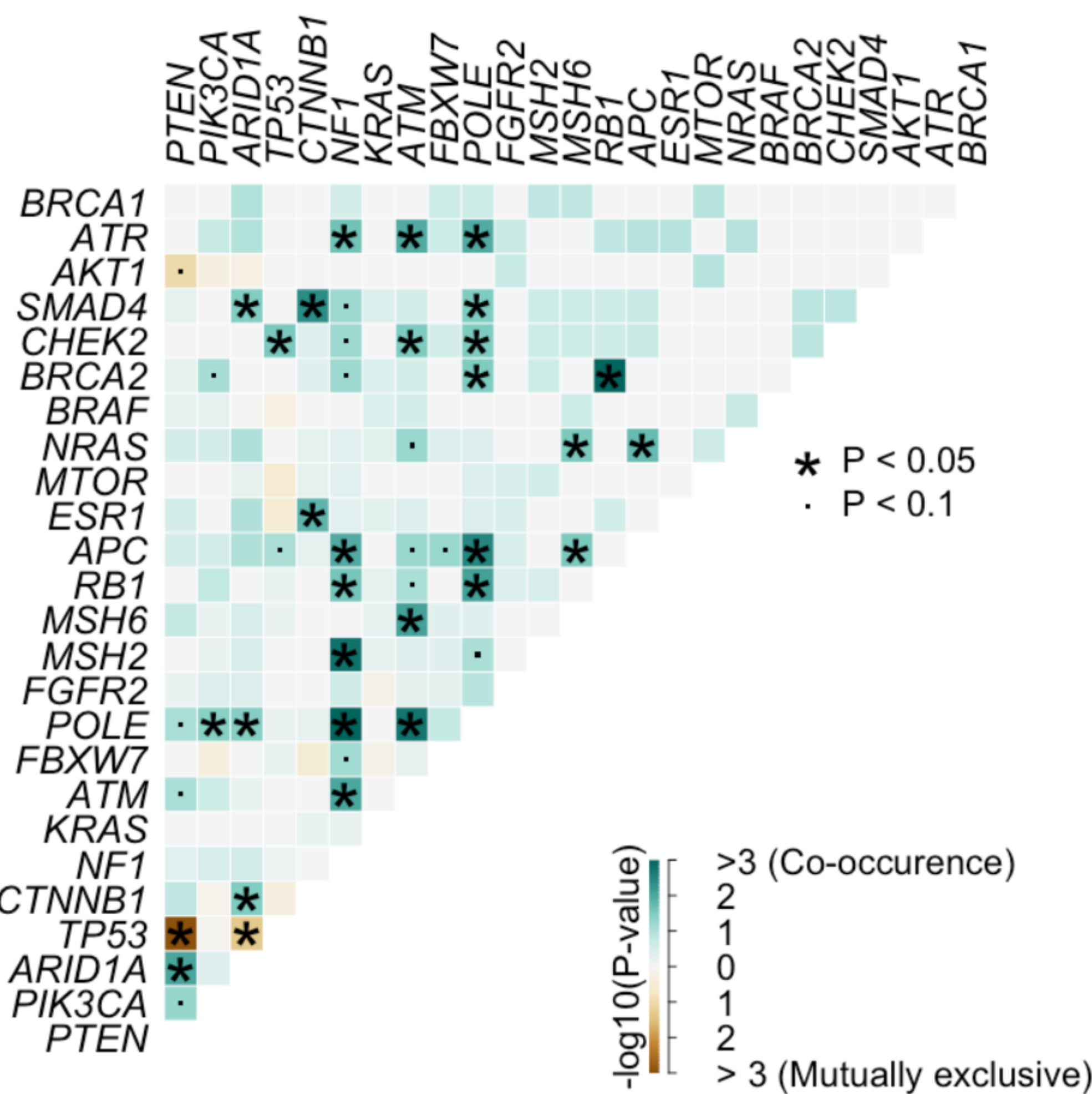


Figure 2. Somatic interaction plot based on cervical swab-based genomic DNA

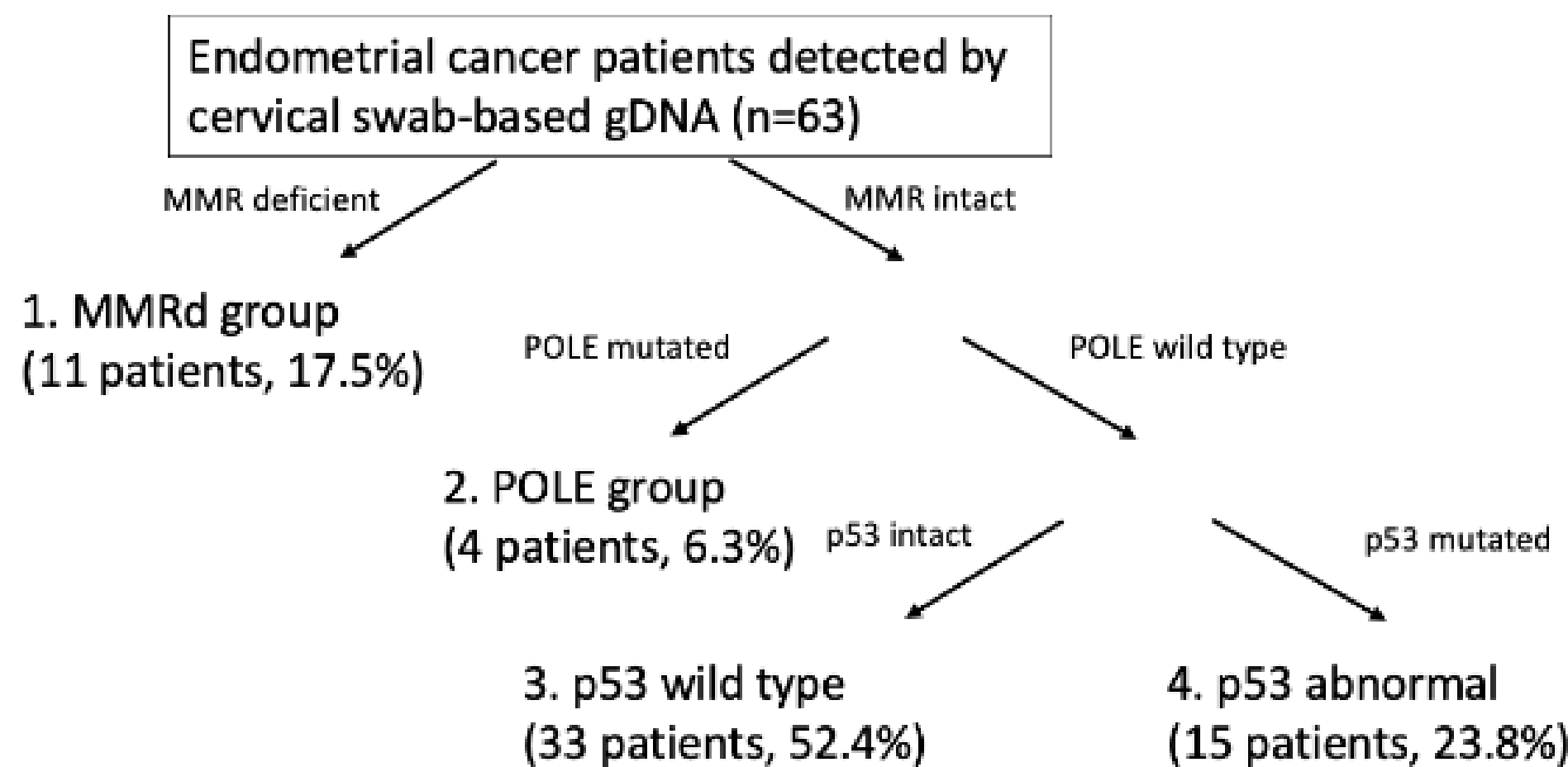


Figure 3. Application of ProMisE based on cervical swab-based genomic DNA.

Mutations	Cancer	Benign
Variant (+)	63	1
Variant (-)	31	18

Table 1. Sensitivity and specificity of cervical swab-based genomic DNA.

	Blood (-)	Blood (+)
Swab (-)	12	6
Swab (+)	34	17

Table 2. Comparison of blood-based cell-free DNA and swab-based genomic DNA