**Table S1**: Variant caller commands

|  |  |  |
| --- | --- | --- |
| **Variant caller** | **Version** | **Command** |
| DeepSNVMiner | 1.0 | run\_deepsnv.pl -read1\_fastq R1.fq -read2\_fastq R2.fq -coord\_bed chr22.bed -filename\_stub test  |
| FreeBayes | 1.0.2-6 | freebayes -f chr22.fa bam\_file > freebayes.vcf  |
| GATK | 3.2.2 | 1) java -jar GenomeAnalysisTK.jar -T HaplotypeCaller -R chr22.fa -L chr22.intervals -I bam\_file -o gatk.gvcf -variant\_index\_type LINEAR -variant\_index\_parameter 128000 --minPruning 3 -ERC GVCF -contamination 0.0 --maxNumHaplotypesInPopulation 200 --max\_alternate\_alleles 3 2) java -jar -T GenotypeGVCFs -R chr22.fa -L chr.intervals -V gatk.gvcf-o gatk.vcf |
| LoFreq | 2.1.2 | lofreq call -f chr22.fa -o lofreq.vcf bam\_file |
| SAMTools | 0.1.19 | samtools mpileup -C50 -uDEf chr22.fa bam\_file | bcftools view -vcg - > sam.vcf |

Variant caller commands utilized in our example. The commands listed match the exact commands run with the exception of the shortening of file names. The commands were chosen by either following documentation suggestions, or else by using default options.

**Table S2**: False positive rates for variant callers at increasing dilution levels

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Dilution Percent** | **Total Variants** | **Deep-****SNVMiner**  | **FreeBayes** | **GATK**  | **LoFreq**  | **SAMTools** |
| 0 | 799962 | 0.014 | 0.16 | 34.05 | 0.18 | 31.94 |
| 50 | 408518 | 0.012 | 0.15 | 29.43 | 0.18 | 30.11 |
| 90 | 81708 | 0.012 | 0.17 | 28.22 | 0.21 | 26.09 |
| 99 | 8211 | 0.043 | 0.21 | 15.78 | 0.17 | 46.15 |
| 99.9 | 811 | 0.149 | 0.18 | 16.33 | 3.45 | 0 |
| 99.99 | 74 | 0 | 1.72 | 30.14 | 21.43 | N/A |
| 99.999 | 8 | 0 | 0 | 50.00 | 50.00 | N/A |
| 99.9999 | 2 | 0 | N/A | 0 | N/A | N/A |

False positive rates for DeepSNVMiner compared to FreeBayes, GATK, LoFreq, and SAMTools at increasing variant dilutions.

**Table S3**: False negative rates for variant callers at increasing dilution levels

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Dilution Percent** | **Total Variants** | **Deep- SNVMiner**  | **FreeBayes** | **GATK** | **LoFreq**  | **SAMTools** |
| 0 | 799962 | 41.74 | 31.35 | 71.35 | 66.52 | 99.85 |
| 50 | 408518 | 29.76 | 31.79 | 63.48 | 68.40 | 99.89 |
| 90 | 81708 | 17.83 | 31.45 | 33.86 | 77.41 | 99.90 |
| 99 | 8211 | 15.59 | 32.03 | 18.32 | 78.32 | 99.91 |
| 99.9 | 811 | 17.39 | 31.94 | 17.26 | 79.28 | 99.88 |
| 99.99 | 74 | 9.46 | 22.97 | 31.08 | 70.27 | 100 |
| 99.999 | 8 | 0 | 25.00 | 25.00 | 50.00 | 100 |
| 99.9999 | 2 | 0 | 100 | 0 | 0.00 | 100 |

False negative rates for DeepSNVMiner compared to FreeBayes, GATK, LoFreq, and SAMTools at increasing variant dilutions.

**Table S4**: Dilution series for cell lines HEK293 and OCI-LY10

|  |  |  |
| --- | --- | --- |
| **Sample** | **HEK293 wt MYD88** | **OCI-LY10 L265P MYD88** |
| Sample1 | 0% | 100% |
| Sample2 | 90% | 10% |
| Sample3 | 99% | 1% |
| Sample4 | 99.9% | 0.1% |
| Sample5 | 99.99% | 0.01% |
| Sample6 | 99.999% | 0.001% |
| Sample7 | 99.9999% | 0.0001% |
| Sample8 | 99.99999% | 0.00001% |
| Sample9 | 99.999999% | 0.000001% |
| Sample10 | 100% | 0% |

To measure the sensitivity of DeepSNVMiner a dilution series was performed with genomic DNA from two cells lines: (i) HEK293 (Human Embryonic Kidney): wild-type MYD88 (ii) OCI-LY10 (Ontario Cancer Institute, lymphoma cell line 10): heterozygous L265P MYD88 mutation.