IMGT®, the international ImMunoGeneTics information system®, Laboratoire d’ImmuNoGenétique Moléculaire (LIGM), Institut de Génétique Humaine (IGH), UMR 9002, CNRS, Montpellier University, Montpellier (France)

Safa Aouinti, Véronique Giudicelli, Patrice Duroux, Sofia Kossida, Marie-Paule Lefranc

IMGT® director: Sofia Kossida (Sofia.Kossida@igh.cnrs.fr)
Bioinformatics manager: Véronique Giudicelli (Veroniqe.Giudicelli@igh.cnrs.fr)
Computer manager: Patrice Duroux (Patrice.Duroux@igh.cnrs.fr)

Abstract (3-6), the first web portal for next generation sequencing (NGS) analysis of IG and TR, provides the identification of the variable (V), diversity (D) and joining (J) genes and alleles, analysis of the V-(D)-J junction and characterization of the IMGT clonotype (AA) for amino acids.

1- V-Domain combinatorial diversity

Somatic mutations in B cells of lymph nodes and spleen. Enzyme: AICDA (activation induced cytidine deaminase).

2- V-Domain junctional diversity

2- V-Domain junctional diversity

At the codon level, the consequence of the nucleotide transition (i) and transversion (e, v)

3- V-Domain mutational diversity

Enzymes: exonuclease (deletion of nucleotides (nt)).

TdT (addition of nt) → N-REGION (N1, N2).

Standardized description

2 types of nucleotide mutations can be distinguished: transition (i) and transversion (e, v)

At the codon level, the consequence of the nucleotide mutation can be:

Silence (i): no AA change

Replacement (v): AA change

Expected R (AA change) and S (no AA change):

Nucleotide mutation types

Replacement (R) and Silence (S) occurrences

R and S analysis results

Results for CDR-IMGT

Results for FR-IMGT

Conclusion

IMGT/StatMutation answers the need for somatic mutations statistical analysis from IMGT/HighV-Quest output of high throughput IG repertoire. It provides a standardized study of mutations and AA changes which are of prime importance for the specificity and affinity of antibodies during protective (vaccination, cancers and infections) or pathogenic (autoimmunity and lymphoproliferative disorders) immune responses.

References:

Acknowledgments: this work was granted access to the HPC resources of HPC-LR and of CINES and TGCC-CEA under the allocation 036029-(2010-2017) made by GENCI.

IMGT® founder and executive director emeritus: Marie-Paule Lefranc (Marie-Paule.Lefranc@igh.cnrs.fr)

IMGT® Copyright 1989-2017 IMGT®, the international ImMunoGeneTics information system®

http://www.imgt.org