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16 November 2023

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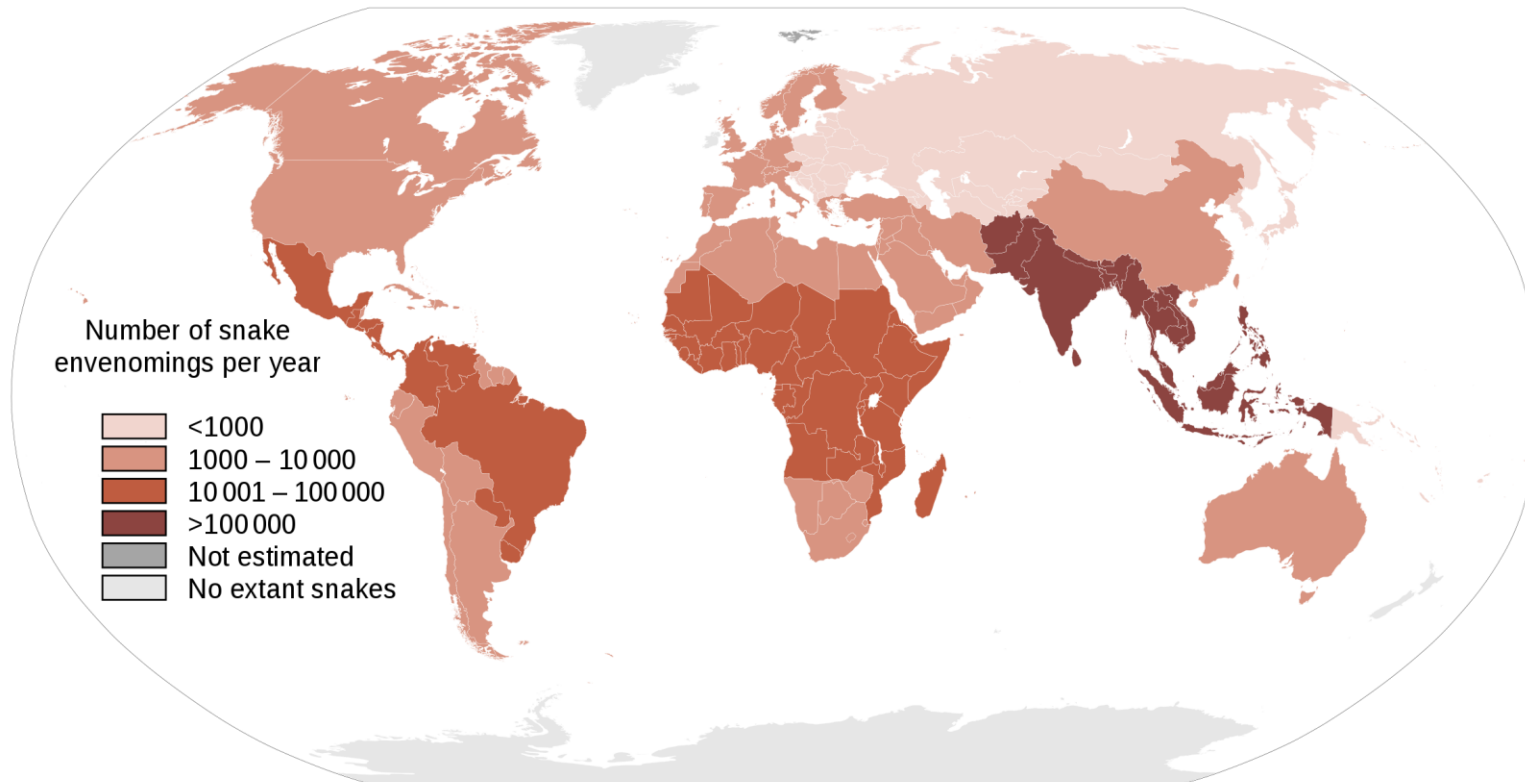
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# Murderous Venom - A Universal and Affordable Antidote Against Snakebite

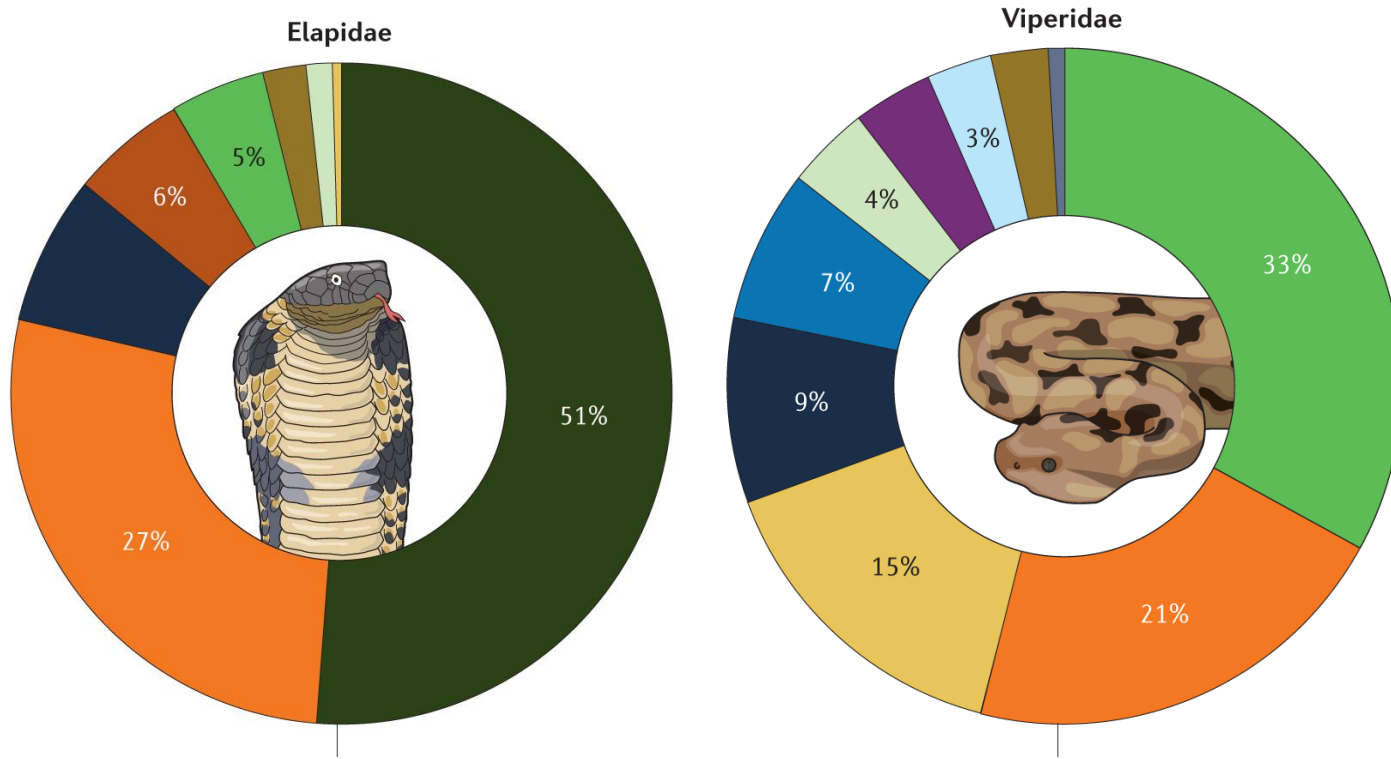
Pedro Alexandrino Fernandes, Dep. Chemistry & Biochemistry, Faculty of Sciences, University of Porto

# Snakebite Envenoming



- Snakebite envenoming is the deadliest Neglected Tropical Disease
- Current antibody-based treatments are too complex and expensive to be applied in remote tropical regions, where most snakebite accidents happen.
- **New treatments are urgently needed.**

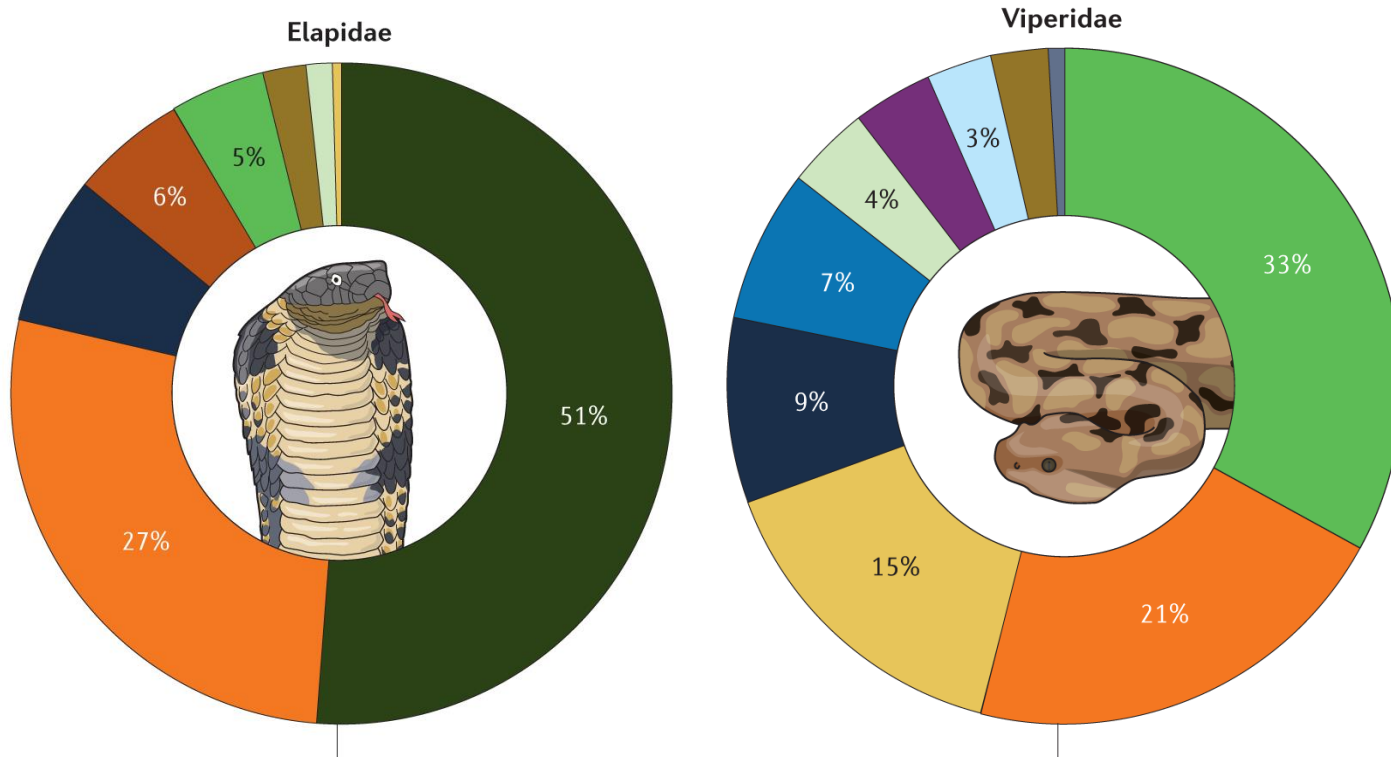
# Snake Venom Composition



- PLA2
- SVSP
- SVMP
- LAAO
- CRiSP
- 3FTx
- KSPI
- CTL/SNACLEC
- DIS
- NP
- DEF
- Other

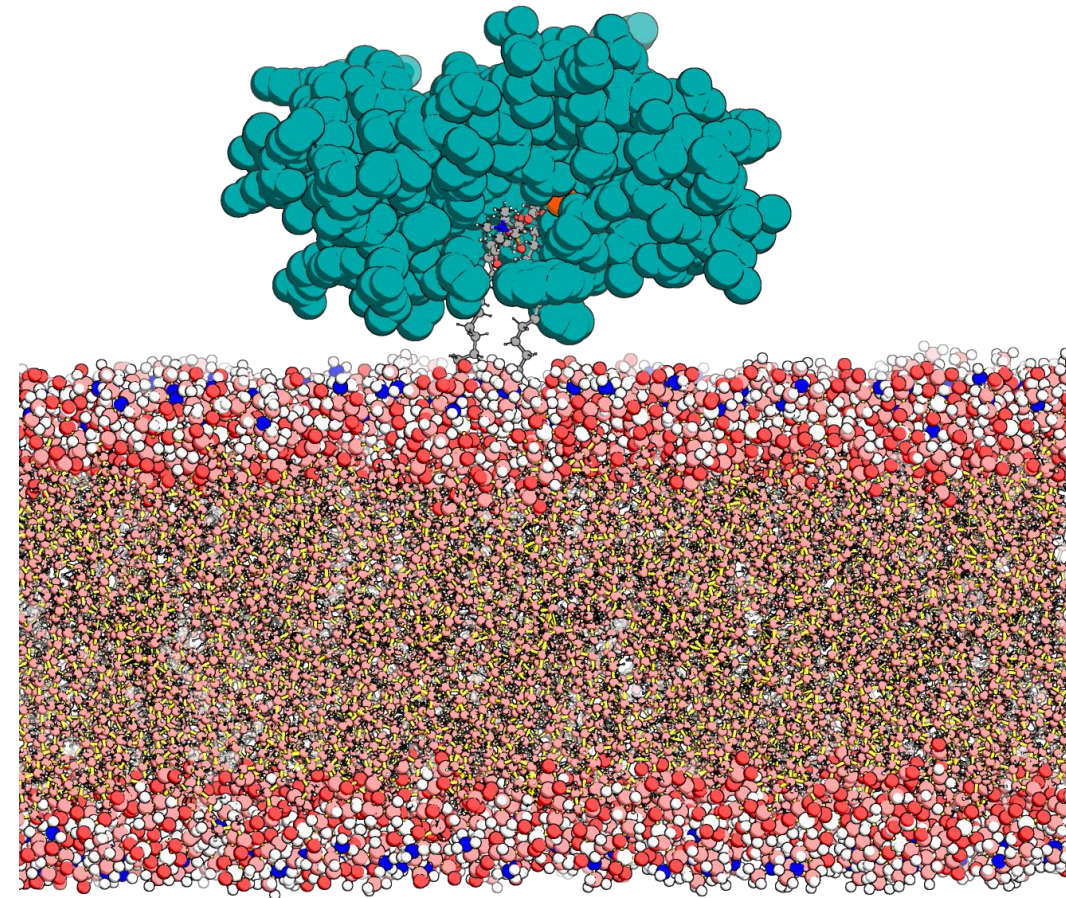


# Phospholipase A2- PLA2

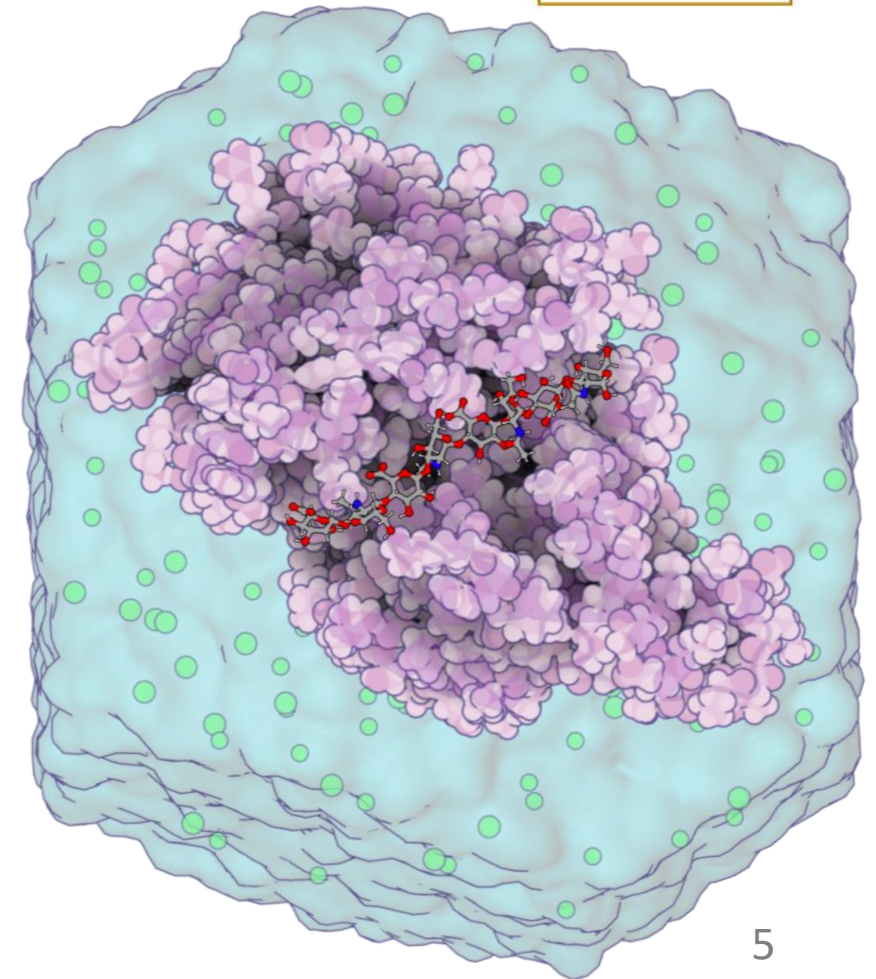
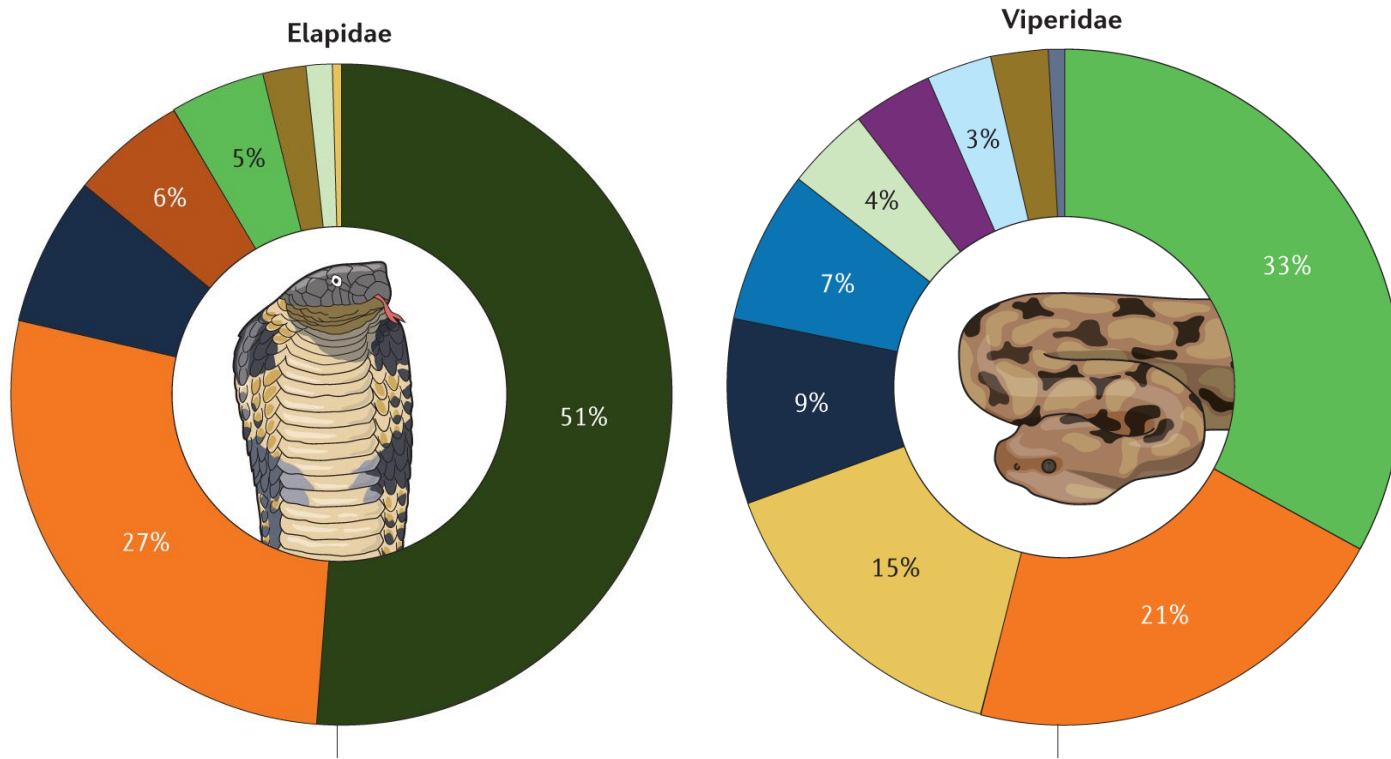


- PLA2
  SVSP
  SVMP
  LAAO
  CRiSP
  3FTx
  KSPI
- CTL/SNACLEC
  DIS
  NP
  DEF
  Other

Pedro A. Fernandes et al, *Nat Rev Chem* 6, 451–469 (2022)



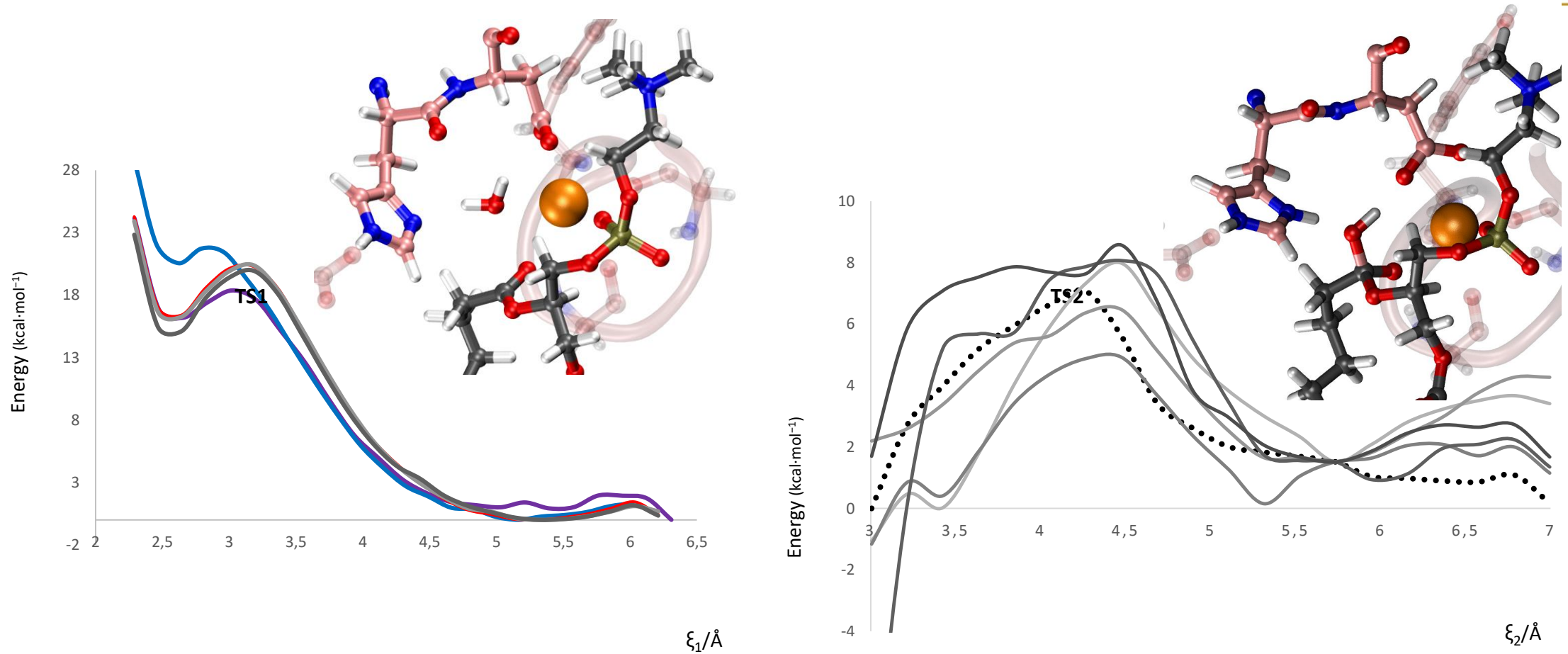
# Hyaluronidase



- PLA2
- SVSP
- SVMP
- LAZO
- CRiSP
- 3FTx
- KSPI
- CTL/SNACLEC
- DIS
- NP
- DEF
- Other



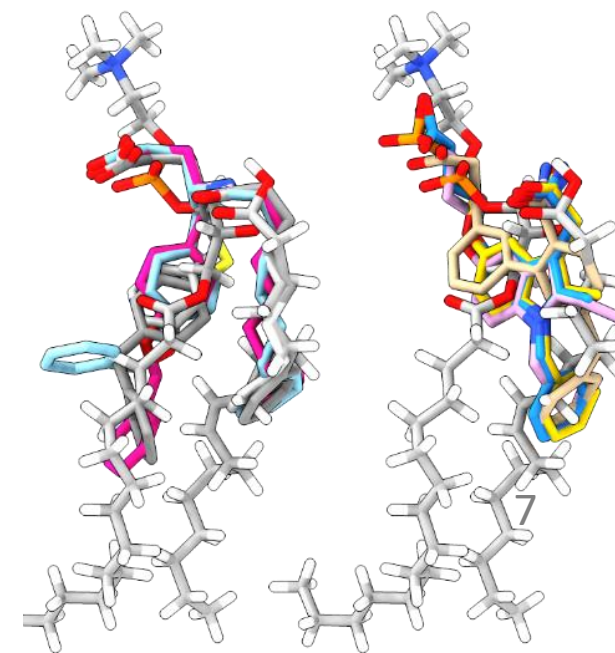
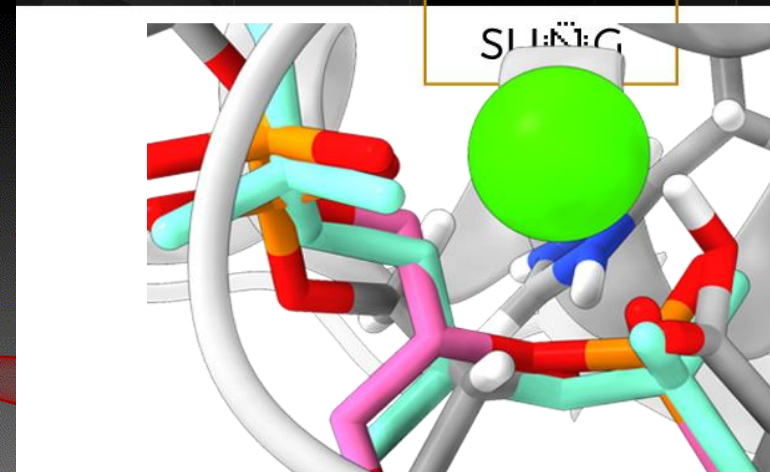
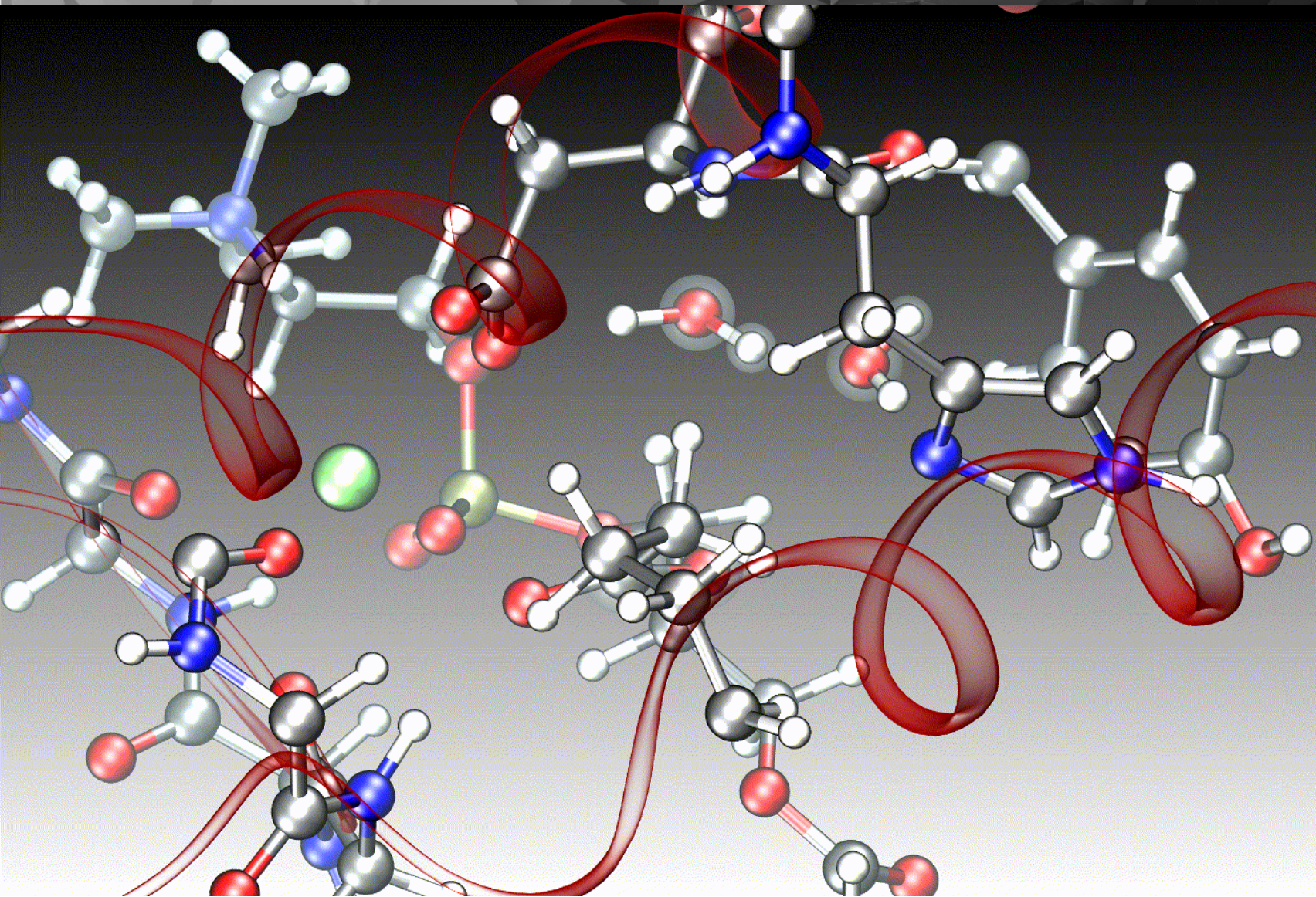
# QM/MM MD simulations of PLA2



Numeric integration & matrix diagonalisation – 1 million core hours per energy profile



# QM/MM MD simulations of PLA2





# Conclusion



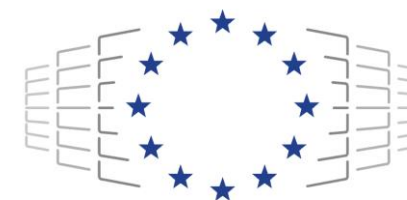
- The project started in May 2023.
- The study of the reaction mechanism of PLA2 is very advanced.
- The study of the reaction mechanism of HYA is starting.
- Drug discovery will start after these two tasks.
- Ca. 6 million core hours were spent in the first part of the project.
- The project is running at full speed.



# Acknowledgements



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