

Molecular complexity of voltage-gated sodium channels

Citation for published version (APA):

Xenakis, M. (2021). *Molecular complexity of voltage-gated sodium channels: theory and applications in mutation-response prediction*. [Doctoral Thesis, Maastricht University]. ProefschriftMaken.
<https://doi.org/10.26481/dis.20210526mx>

Document status and date:

Published: 01/01/2021

DOI:

[10.26481/dis.20210526mx](https://doi.org/10.26481/dis.20210526mx)

Document Version:

Publisher's PDF, also known as Version of record

Please check the document version of this publication:

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Propositions belonging to the Dissertation:

Molecular complexity of voltage-gated sodium channels; theory and applications in mutation-response prediction

- Cumulative hydrophobic topology represents the "fingerprint" of a voltage-gated sodium channel's functional architecture
- Invariants of cumulative hydrophobic properties represent the "memory" of a voltage-gated sodium channel structure, i.e., they encapsulate evolutionary-conserved information
- Phase transitions can occur in voltage-gated sodium channel structures due to hydrophobic inhomogeneities in the atomic structure
- Disease-causing variants of voltage-gated sodium channels can be largely predicted from structure-site-specific hydrophobic information
- Cumulative hydrophobic effects can provide a first-principles understanding of channel protein stability, function, and, eventually, assembly
- Molecular complexity approaches can efficiently reduce the complexity of the problem of analyzing a channel protein's functional architecture

- Machine-learning approaches should be coupled with complexity theory in order to understand "fine-tuning" phenomena in channel protein structures
- Complexity-driven inquiries in the field of biomedicine can revolutionize the way we understand molecular pathophysiology which, in turn, can improve prognosis, diagnosis, and treatment of human diseases.
- "And there was a beautiful view, But nobody could see.
'Cause everyone in the Island was saying, Look at me!
Look at me!" - Laurie Anderson