

# Understanding Liposome Flux Assays in the context of a Bacterial Sodium Voltage Gated Channels (NavAb)

Biological data analysis in R

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# Introduction

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## Chart of NavAb affinity constants for different ions

Ion(s)	Affinity Constant(Ka)
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H <sup>+</sup>	??

Table 1: NavAb affinity constants

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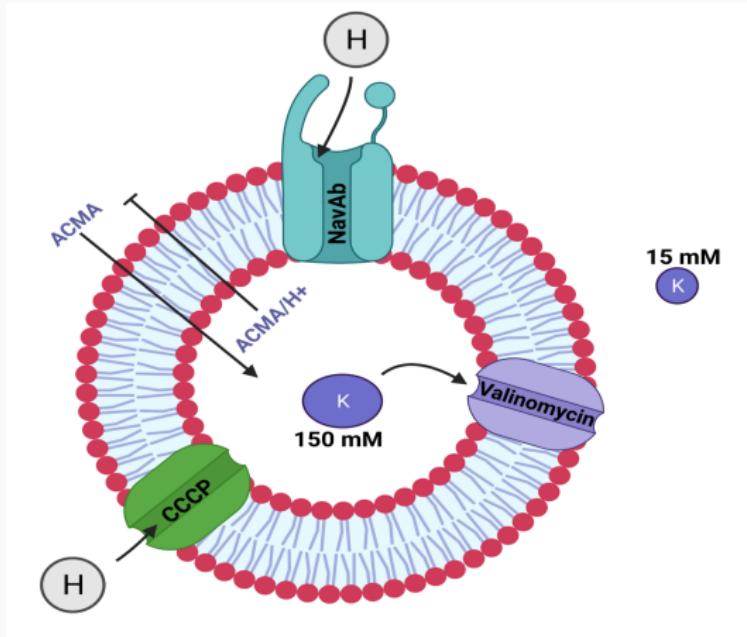


Figure 1:  $\text{Na}^+$ -insert liposome

# Practical image of experiment

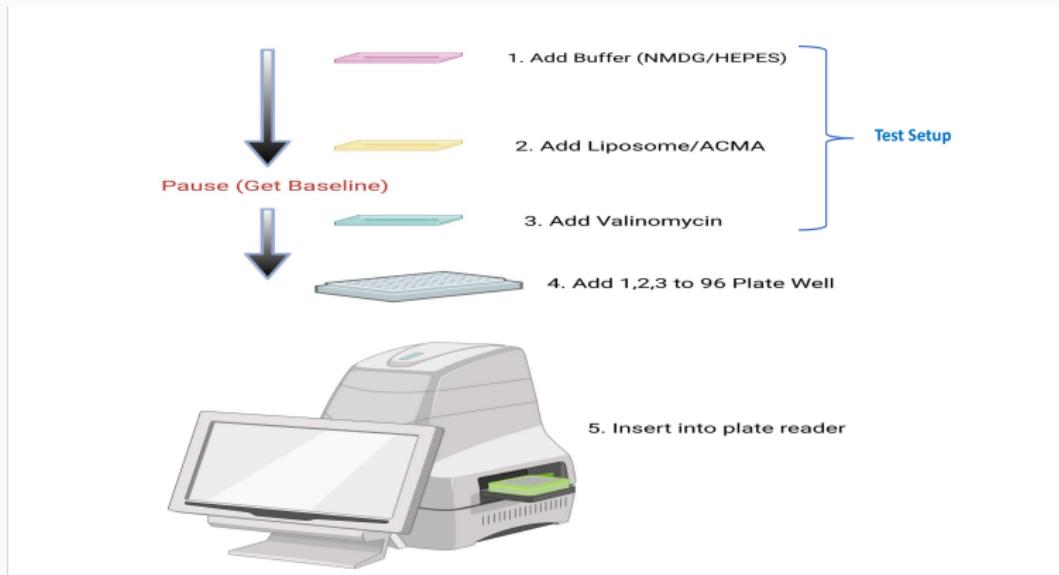


Figure 2: experiment

## Diagnostic results in Excel

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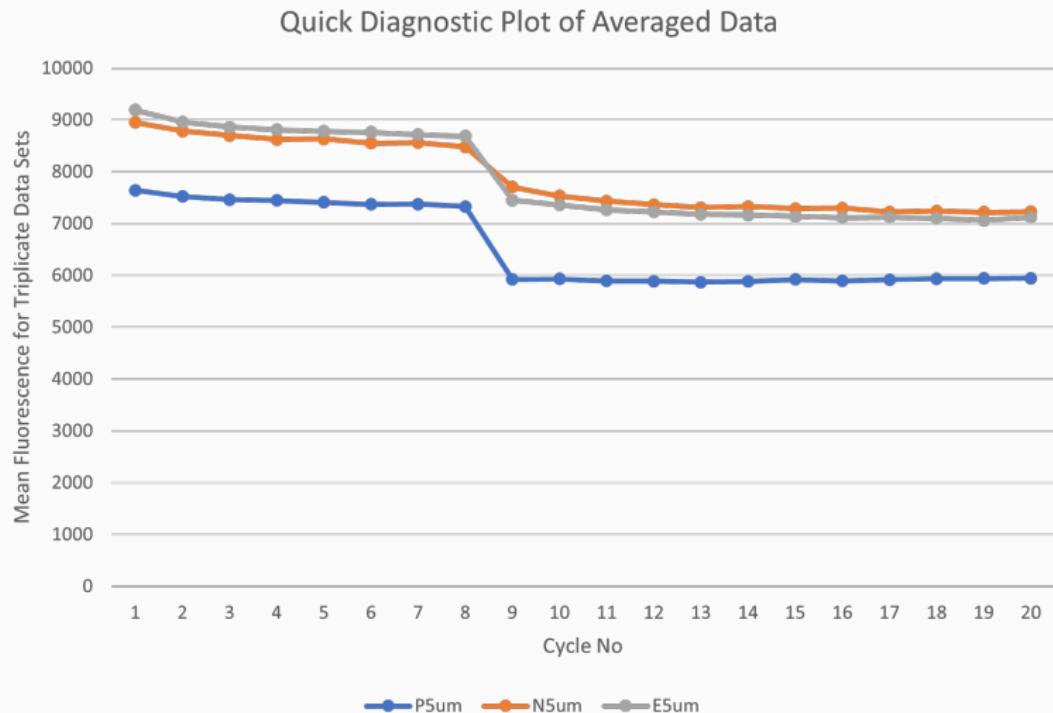


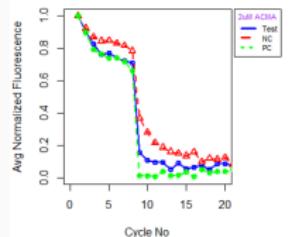
Figure 3:  $\text{Na}^+$ -insert liposome

Normalized Results (Makes all the  
sense in the world)

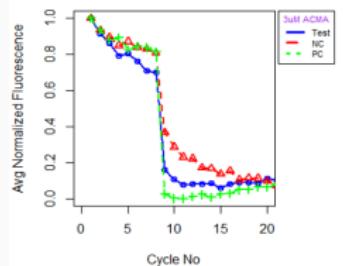
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# Fluorescence measured at 2,3,5 $\mu$ M

NavAb Liposome Flux Assay (2 $\mu$ M ACMA)



NavAb Liposome Flux Assay (3 $\mu$ M ACMA)



NavAb Liposome Flux Assay (5 $\mu$ M ACMA)

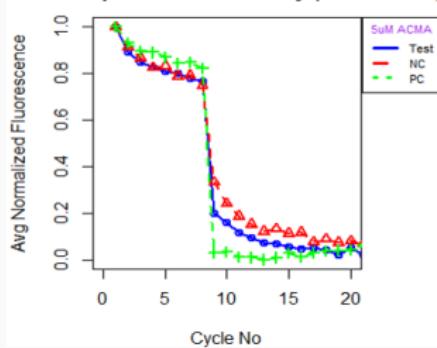
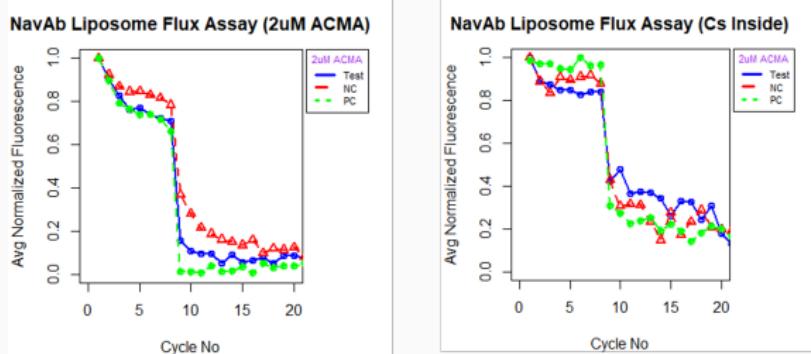


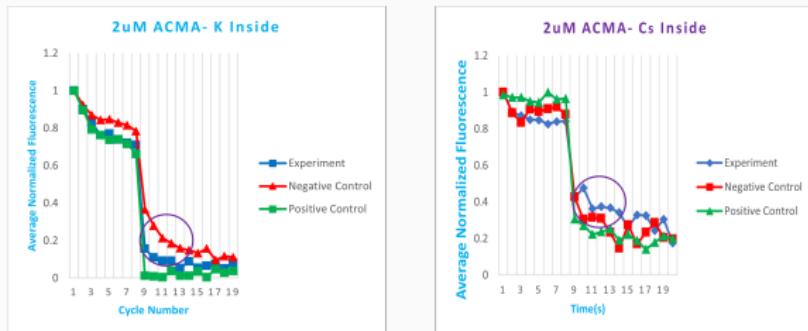
Figure 4: Legend: Noramlized fluorescence in R within the signal zone

# Fluorescence measured with K<sup>+</sup> vs Cs<sup>+</sup> inside the liposome $\mu\text{M}$



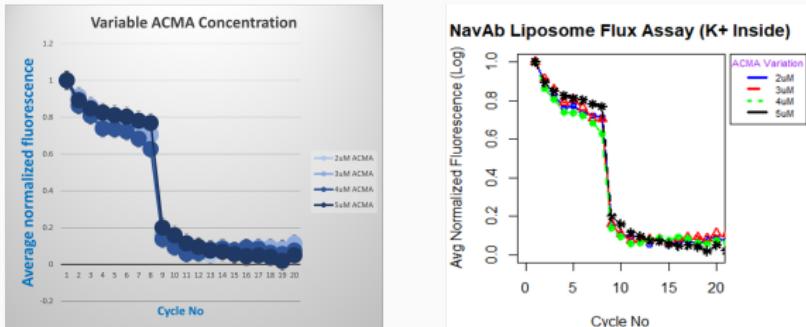
**Figure 5:** NavAb K-conductivity is stronger than Cs-conductivity as indicated by the initial affinity table

# Fluorescence measured with K<sup>+</sup> vs Cs<sup>+</sup> inside the liposome $\mu\text{M}$



**Figure 6:** NavAb K-conductivity is stronger than Cs-conductivity as indicated by the initial affinity table

# ACMA dosage at 2,3,4,5 $\mu$ M



**Figure 7:** Fluorophore dosage is not a factor in its quenching, rather system properties (Ion conductivity etc.) determine quenching

## Noise vs Signal

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# Fluorescence measured at 0.2 and 20 $\mu$ M

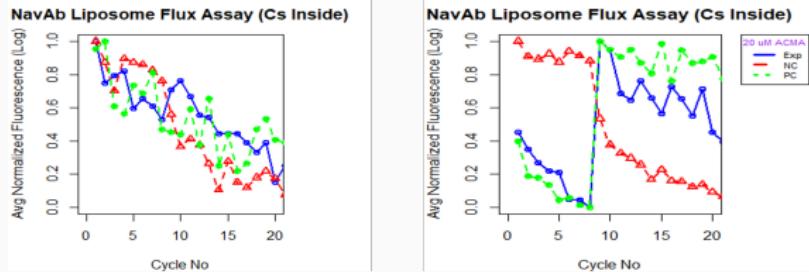


Figure 8: Legend: Noramlized fluorescence in R within the signal zone

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We showed that the Nernst Potential (Valinomycin) and proton flux (CCCP) should be investigated as potential factors in ACMA quenching behavior.

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Thanks and Questions?

## References

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- [1] Zhenwi. Su. *Novel cell-free high-throughput screening method for pharmacological tools targeting K<sup>+</sup> channels.* PNAS, 113(5744-5788), 2016.
- [2] Joshua V. *A Single Molecule Study on The Structural Basis of Ion Selective Permeation in Voltage-Gated Sodium Channels.* , 2021.