

# Organelle communication in *Toxoplasma gondii*

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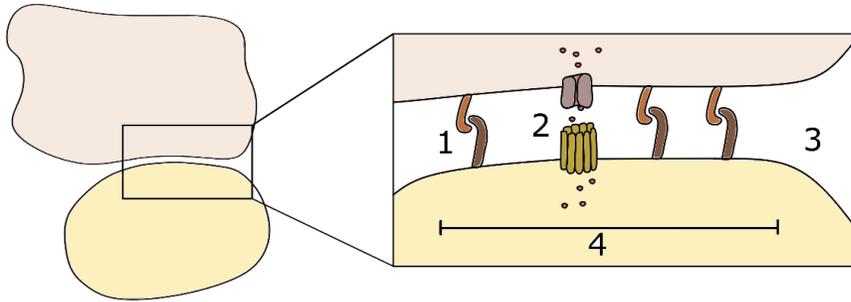
*4<sup>th</sup> year PhD*

Sheiner lab, primary supervisor: Dr Lilach Sheiner



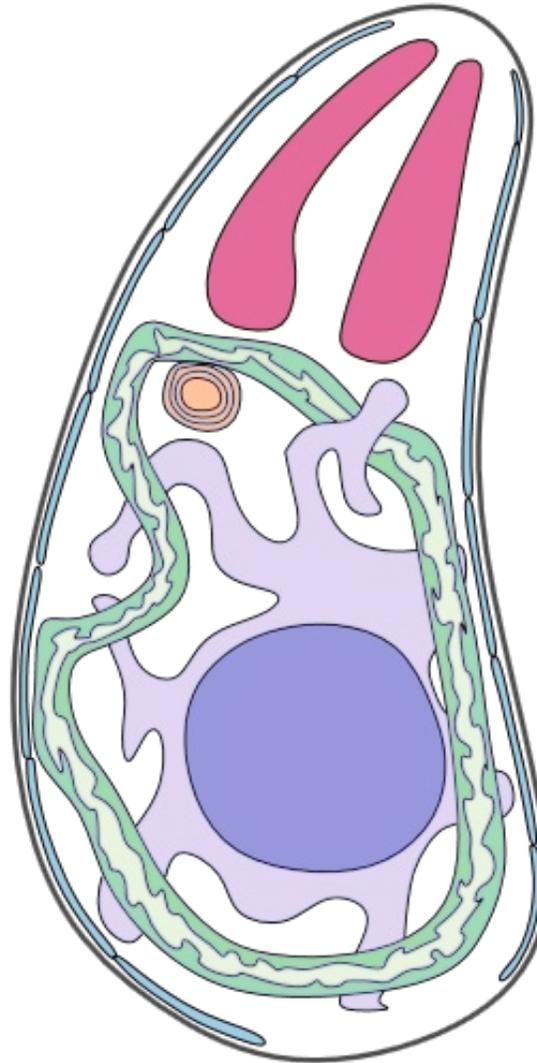
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# Organelle communication via membrane contact sites



## Primary aims of my project:

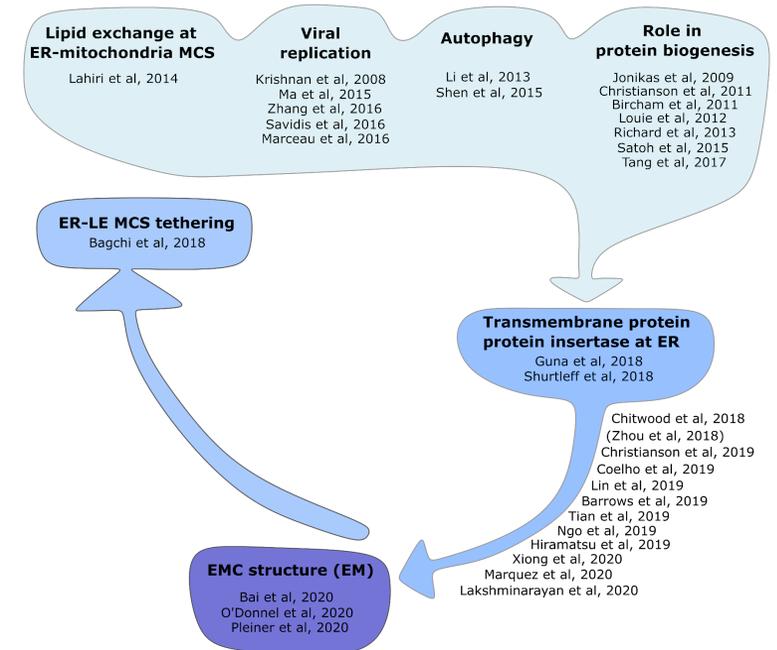
- Identify how we can study MCS in *T. gondii*
- Characterise ER membrane complex (EMC)
- Investigate novel MCS



*Toxoplasma gondii*

## ER membrane complex (EMC)

Complex in the ER membrane.



EMC is transmembrane protein insertase at the ER and potential organelle tether at membrane contact sites.

# ER membrane complex characteristics (*Toxoplasma gondii*)

*T. gondii* has 8 subunits that are relatively divergent from EMC subunits of yeast and mammals.

All subunits are essential except one (TgEMC1-6+8 are essential, TgEMC7 is not).

Loss of essential TgEMC subunits starts to kill parasites within 72hrs.

TgEMC forms a complex at the ER membrane and likely novel *T. gondii*-specific subunits are present.

TgEMC subunits have distinct functions within the complex.

Loss of TgEMC impact morphology of some organelles.

Insertase function under investigation.

Human EMC subunits fail to rescue the function of TgEMC. Amino acids critical for EMC function in other species but that is not the case for *T. gondii*.

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tr|Q8IHW7|Q8IHW7_PLAF7          -----MKYTEITIDGGAYA          14
tr|S8EVM5|S8EVM5_TOXGM          MAPCESSASLSSSSSSFAGLFSDEGGHAPKPVSVARSSACGVSSSPFAVATATAYS      60
sp|O43402|EMC8_HUMAN             -----MPGVKLTITQAYC          12
                                     : : **
tr|Q8IHW7|Q8IHW7_PLAF7          KIFMHSIKYSCDDVGGILIKYLSNKKY-----KKLITNYIPLFHH-ILSP        62
tr|S8EVM5|S8EVM5_TOXGM          RMVMAAHTQDAVNGVLLGRLLFNAGEPRDRADIQQPHTLLQVDFPFPF-ILFP      119
sp|O43402|EMC8_HUMAN             EMLVHGAKYPCAVNGLLVAEQKPKK--EHLPLGGPGARHTLFVDCIPLFHTLALAP    69
                                     *:.:.*:* : *:*:.. : : * : : **
tr|Q8IHW7|Q8IHW7_PLAF7          YLNLAFTLVENYKDKDER-----IIGY          85
tr|S8EVM5|S8EVM5_TOXGM          MMTCAFELVEELCESTRECAPKADGEDRRLAGAKGRITREPKAPREHSEGLAQIIGY   179
sp|O43402|EMC8_HUMAN             MLEVALTLIDSWCKDHSYVIA-----GY          92
                                     : : * : : : :
tr|Q8IHW7|Q8IHW7_PLAF7          FHSISDDSKNSDI-ENIKVCELSIEKLIHYNDAFVCLLEFSKYVNDENCLNI----- 138
tr|S8EVM5|S8EVM5_TOXGM          YHNCNLYTFAVDVQPSVVAAMAATAVHAKYQAILCLMHRRLTAGSFRTEAVEARQTA   239
sp|O43402|EMC8_HUMAN             YQANERVKDA-----SFNQVAEKVASRIAEGFSDALIMVNTKFTMD-----CV   137
                                     : : : : : : : : : : : : : : : :
tr|Q8IHW7|Q8IHW7_PLAF7          -----FMKNDKSNWEKGN-----VVI-SNENKEFLKKNISNQHLYNYDFDHLNSMKDF 188
tr|S8EVM5|S8EVM5_TOXGM          ABAACVYMQSEWQLLEAEQVNL-TDAANYVAQSVIRDATYMSLTDMDHLYDPT----- 295
sp|O43402|EMC8_HUMAN             APTHTVYEHENRWRCDREHHDYCEDWFEAQRISASLLDSRSYETLVDFDHLDDIRNDW 197
                                     : : : : : : : : : : : : : : *:*:*
tr|Q8IHW7|Q8IHW7_PLAF7          MNPDLFNYS-----          198
tr|S8EVM5|S8EVM5_TOXGM          -----LSPNLSLLTOYEELEKDEELENAGVNI SDEDVGLAGLSE          337
sp|O43402|EMC8_HUMAN             TNPEINKAVILHC-----          210
    
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