RC: Please make sure you have addressed all points mentioned in my recent emails so I don’t need to resend any of those.

You should refer to the inconsistencies doc posted by RC for details of each task when you work on them. This is only a brief summary for purposes of schedule. It is possible that some of the tasks have been omitted from that doc in the process of preparing this schedule.

Some of the orderings of tasks below are not consistent with a,b,c,d ordering in RC’s doc, as highlighted below.

If you are not sure that all comments will be addressed in your next revision, please post this markup to wiki as well.

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| --- | --- | --- | --- | --- |
| **Priority** | **Task** | **Sub tasks** | **Goal** | **Date** |
| 1A | Detailed draft based on an analysis of conformational energies | Verify if the conformational energies from Prime/MM-GBSA follow the same trend as 2-12 ns energies. | To identify if we could rank order the stability of the complex/loop reasonably | 19th  Aug |
| 1B | Analysis of binding energies  Verify if the binding energies (from all energy functions –Prime MM/PBSA, Amber MM-PBSA and Amber MM-GBSA) for open/closed loops among complexes are along expectations | Binding affinity of NAD+ is greater for open loop  Binding affinity of INT is greater for closed loop  Binding affinity of co-product (AADPr) is greater for closed loop.  These needs to be validated.  Document a report to Dr.Raj | To identify if binding energy estimates are able to recapitulate experimental findings. | 19th  Aug  1A&1B  1 day |
| 1C | Apply by-component and by-residue MM interaction energy scoring to identify why this inconsistency arises  *NB: I will be re-running some of them over the weekend in the interest of saving time. All MM/PBSA and GBSA needs to be re-run* | Amber per-residue interaction/binding energies can be obtained but not per residue MM based potential energies.  *NB\* we need to re-run Amber MM/GBSA on MD trajectories to extract per-residue binding energies. Each run takes about 3-4 hrs. We also need to write analysis script to extract them from the output file.* | To identify key residues that contributes to substrate/product binding.  Can be used to correlate MD findings with experimental mutagenesis data.  *Per residue script will parse a .dat file, read the values corresponding to residue of interest, loop through all the log files and fetch the average energy. This will be done for all residues listed in an array*. | 2-3 days  22nd and 23rd  Aug |
| 2A | Estimation of energy error from side chain prediction  Cont... | 1.Based on “derived Apo energies” as estimated by Dr.Raj compare   1. SIRT3/INT/NAM Open   Vs  SIRT3/NAD+/AC-CS2 Open loop   1. SIRT3/INT/NAM Closed   Vs  SIRT3/NAD+/AC-CS2 Closed loop | Sirt3/INT/NAM – Open done  Closed loop needs to be done | Aug24 th |
| 2B | Extensive validation of side chain errors | Side chain validation studies across  native xtal structures 4FVT and 4BVG as “detailed by Dr.Raj. Includes analysis of exposed vs buried, polar vs nonpolar RMSD vs delta energy  Residues within 7.5Å form the loop would be repacked.  Residues subjected to be repacking/prediction may not be consistent (some residues tend to vary between open/closed conformations as we are using a distance based cut-off).  Report global RMSD and local (loop/per-residue of loop region) RMSD | To identify the amount of energy error and the level of error propagated in each model  *NB\*Each side chain prediction takes about 4 hrs.*  *\*We need to develop scripts or adapt existing scripts to compute per-residue RMSD* | 24,25th  Aug  *It may extend by a day* |
| 2C | Extensive validation of side chain errors cont. .. | Estimate the change(Δ) in energies pre and post side chain modeling on all modelled (4FVT)/side chain repacked (4BVG loop) complex. Identify problematic residues | Identify residues/positions that have problems during repacking/prediction | 26th  Aug |
| 2D | Effect of Prime minimization post side chain prediction? This is to check the effect of global minimization and to see if there are issues with global minimization. | This is to check the effect of Prime minimization and to see if there are issues with global minimization.  It will be carried out on all structured prepared by VR. |  | 29tn  Aug |
| 4 | Loop generated from MD | Identify loop conformations generated by MD sampling and try to rank them ( Either clustering of loop or RMSD) | Use these loop co- formations and try to see if Prime could rank-order it. | 30th Aug  &  31st Aug |
| 6 | Need for new simulation | Based on analysis ascertain the need for new MD simulation | To be decided by Dr.Raj |  |

***NB\* The extra time available during side chain modeling runs will be used to complete the Perl script, which is almost half way through. Hence, I have not listed it as a separate task.***

***NB\* Add literature reference and compare the Prime loop prediction protocol mentioned in literatures.***