Abstract Submitted
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In silico **investigation of molecular effects caused by missense mutations in creatine transporter protein**[1] ZHE ZHANG, Clemson University, CHARLES SCHWATZ, Greenwood Genetic Center, EMIL ALEXOV, Clemson University — Creatine transporter (CT) protein, which is encoded by SLC6A8 gene, is essential for taking up the creatine in the cell, which in turn plays a key role in the spatial and temporal maintenance of energy in skeletal and cardiac muscle cells. It was shown that some missense mutations in CT cause mental retardation, while others are harmless non-synonymous single nucleoside polymorphism (nsSNP). Currently fifteen missense mutations in CT are known, among which twelve are disease-causing. Sequence analysis reveals that there is no clear trend distinguishing disease-causing from harmless missense mutations. Because of that, we built 3D model of the CT using highly homologous template and use the model to investigate the effects of mutations of CT stability and hydrogen bond network. It is demonstrated that disease-causing mutations affect the folding free energy and ionization states of titratable group in much greater extend as compared with harmless mutations.

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