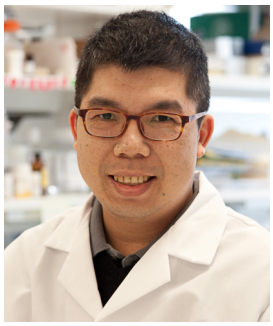
Title: Recent Advances in Genetic Mutations of Prokaryotic and Eukaryotic ABC Transporters



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Proposal

ATP-binding cassette (ABC) ABC transporters are integral membrane proteins commonly found in prokaryotic and eukaryotic organisms. The function of ABC transporters, which actively transport substrates across biological membranes, affects many aspects of life. Mutation analysis allows scientists a better perspective on the structural and functional relationship of ABC transporters in molecular level. Recent reports of ABC transporter X-ray crystal structures have offered new perspectives on substrate binding, ATP hydrolysis, conformational change and, of course, transport.

There are a number of human diseases that are caused by, but not limited to, ABC transporters including cystic fibrosis, tangier disease and cancer. In order to cure these diseases, it is important to understand the role of ABC transporters. With the advances in molecular biotechnology, functionally important genetic mutations of ABC transporters have been discovered. These mutations have a wide range of impact from the transporter to the fate of the host. In human, many disease-related genetic mutations, in the form of single nucleotide polymorphism (SNP), of ABC transporters have been found. ABC transporters are also one of the key components in the field of personalized medicine. Increasing evidence was showed that SNPs of ABC transporters are related to diseases and outcome of drug-treatment. However, reports on the clinical impact of the ABC transporter polymorphisms are not conclusive which makes this subject controversial.

Potential subjects include, but not limited to:

1. Clinical and biological significances of ABC transporters polymorphisms.
2. Structural insights of ABC transporters through mutation analysis.
3. Impact of ABC transporters variations and drug pharmacokinetics.
4. Genetic mutations of ABC transporters and human genetic diseases.
5. Pharmacogenomics of drug resistance and their influence on drug development.
6. Polymorphisms of human ABC transporters in personalized medicine.