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Prediction of proteins localizing to mitochondria and mitochondria-related organelle

ミトコンドリアおよびミトコンドリア由来オルガネラに局在するタンパク質の予測

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While the primary function of mitochondria is to produce energy, they also play an important role in the metabolism and synthesis of other substances. Thus mitochondrial dysfunction is at the core of a surprising range of very common illnesses. Until now, 1000-1500 different proteins are estimated to localize in mitochondria, but numerous mitochondrial proteins remain undiscovered. Finding undiscovered proteins is an important port of elucidating mitochondrial function. Almost all mitochondrial proteins are synthesized in the cytosol as precursor proteins, and subsequently imported into mitochondria. Prediction of mitochondrial targeting signal (MTS) therefore is an efficient approach when identifying undiscovered mitochondrial proteins. In this seminar, I will talk about mitochondrial protein transport and then our prediction method for mitochondrial protein based on MTS. In addition, I will introduce another mitochondria-related organelle, the mitosome and describe how proteins are transported to it. Interestingly, the mechanism of mitosomal protein import is different from mitochondria although mitosomes are derived from mitochondria. Finally, I will talk about our attempt to find novel mitosomal beta-barrel outer membrane proteins.

Keywords: Mitochondria, Mitosome, Protein transport, Prediction of protein subcellular localization, beta-barrel outer membrane protein