

ANNOTATION

of bachelor's graduate work


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Evolutionary conservatism of amyloidogenic properties of nucleoporins with FG repeats

Nowadays investigations of pathological and functional amyloids became more and more actual. And the list of them has increased extremely during the last decade. Functional amyloids have been found as for prokaryotes (e.g. curlins of *Escherichia coli* (CsgA-CsgB); chaplins of *Streptomyces coelicolor* (ChpA-H), etc.), as for eukaryotes (Pmel17, RIP1, and RIP3, semenogelin of *Homo sapiens*, etc.). Moreover, there are conservative functional amyloids among different organisms. For example, two orthologous functional amyloids are implicated in the memory's consolidation: CPEB of *Aplysia californica* and Orb2 of *Drosophila melanogaster*. These proteins take part in the translation of the short-term memory into the long-term one. The latter demonstrates the conservativity of amyloid features among distant taxonomic groups. Amyloid properties were shown for several structural components of nuclear pore complexes, nucleoporins,. It has been demonstrated that yeast nucleoporins Nsp1 and Nup100 can form amyloid-like aggregates, including their FG-rich regions. Moreover, as it was previously noted, that amyloid features can be evolutionally conservative for same proteins of different organisms. In the work we checked if the same properties are observed for all nucleoporins among various taxonomic groups or not.

According to the bioinformatical analysis, we established that almost all analyzed nucleoporins are potential amyloids. However, not all of them include conservative regions with amyloid properties. In the case of Nup159 conservative amyloid regions have been found only among Ascomycota phylum, and for Nsp1 – Chordata phylum. Nup49, Nup57 and Nup58 include such fragments in the majority of analyzed groups. So, as Nsp1, Nup49, Nup57 and Nup58 form FG-hydrogel, it could be proposed that FG-hydrogel's nucleoporins have conservative amyloid regions. And these domains correspond to FG-repeats, which play a key role in the nuclear-cytoplasmic transport.