Network modules as novel molecular disease definitions for precision theranostics

Propositions to accompany the thesis

Network Modules As Novel Molecular Disease Definitions For Precision Theranostics

Cristian Nogales Calvo, 16 December 2021

1. Systems medicine and its therapeutic arm, network pharmacology, revolutionize how we define, diagnose, treat, and, ideally, cure diseases.
2. Disease-associated proteins tend to cluster in the same protein interactome neighbourhood, forming disease modules.
3. Canonical signalling pathways are highly curated and lack relevance versus cellular nanodomains and protein-protein interaction modules.
4. For medical relevance, the term "oxidative stress" needs to be redefined into ROS-related signalling modules with distinct pathological relevance.
5. ROS dysregulation and impaired cGMP signalling link several cerebro- and cardio-metabolic disease phenotypes into one cluster, ideally suited as a test case for mechanistic redefinition of diseases.
6. Precision drug therapy will require disease endotyping, for which precision biomarkers are the key knowledge and technology gap.
7. Repurposing registered drugs can rapidly address unmet medical needs, outcompeting classical drug discovery.
8. Network pharmacology will extend even to cancer, enabling non-toxic, targeted cell arrest and allowing the immune system to take over again.
9. Looking at the earth from afar, you realize it is too small for conflict and just big enough for cooperation. (Yuri Gagarin)
10. We are made of star-stuff. We are a way for the cosmos to know itself. (Carl Sagan)