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The Remodel of the "Central Dogma": A Metabolomics Interaction Perspective

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Aim

Herein, we propose a broad updated perspective for the flux of information diagram centered in metabolomics, including the influence of other factors, such as epi genomics, diet, nutrition, and the gut- micro biome.

Introduction

Sixty-three years ago, Francis Crick gave a lecture in which he presented the diagram called the "central dogma." This dogma states that the transfer of information from DNA to DNA/RNA, or from nucleic acid to protein, may be possible, but the transfer from protein to protein or protein to nucleic acid is impossible.

Metabolites are the substrates and products of molecular mechanisms linked to the steps in the flux of information. Molecular modulation can start outside the host organism, as metabolites can come from the metabolism of microorganisms, diet, and other exogenous sources (Johnson et al., 2012; Martin et al., 2007; Tang et al., 2015). One good example of a metabolite is trimethylamine N-oxide (TMAO), commonly found in urine; it can be generated directly from the diet by ingestion of fish, or indirectly from gut-microbiome choline metabolism.

Metabolites can induce macromolecule activity and control phenotypes. It has been shown that omics-scale techniques provide better correlation than single approaches, which indicates that the "central dogma" is a wide integration of information. Recently, Bar et al. analyzed 1251 metabolites from the serum of 491 individuals and by machine learning deduced that the diet and microbiome both represent 50% of an individual's metabolic profile . This concept is a paradigm shift in that it reshapes the conventional thinking about the molecular linear "central dogma," placing metabolomics at the center, not only providing a simple readout to other omics, but also acting as a master regulator of the whole system.

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