

Title	Systems biology strategy to regulate the proinflammatory response and enhance the cancer cell death
Sub Title	
Author	林, 謙太郎(Hayashi, Kentaro)
Publisher	慶應義塾大学湘南藤沢学会
Publication year	2014
Jtitle	生命と情報 No.21 (2014.) ,p.11- 11
JaLC DOI	
Abstract	Tumor or cancer immunology is a new and fast growing field where the interactions of the inherent immune system with malignant cancers have shown the suppression of disease progression. In this field, systems biology approach is required to understand and control the cellular response, since cellular behaviors are highly dynamic, complex and well orchestrated. This thesis describes the current understanding of the systems biology approach and addresses the connectivity between immunology and systems biology. The main aims of this research are i) to regulate the proinflammatory response in Tumor necrosis factor (TNF) signaling pathway and ii) to understand the resistance mechanisms for cancer treatment in TNF related apoptosis inducing ligand (TRAIL) signaling pathway. Therefore dynamical computational models were developed using the well-established perturbation response approach, and analyzed the dynamics of key signaling molecules and gene expressions were analyzed. Using this systems biology approach, a key molecule was identified to effectively regulate, but not abolish, the proinflammatory response in TNF signaling and we also found a target to enhance cell death in TRAIL resistant cancer cells. This work shows systems biology approach integrating computational approaches and wet bench experiments shed light on the drug development for the regulation of the immune-mediated diseases.
Notes	慶應義塾大学湘南藤沢キャンパス先端生命科学研究会 2014年度学生論文集 博士論文ダイジェスト
Genre	Technical Report
URL	https://koara.lib.keio.ac.jp/xoonips/modules/xoonips/detail.php?koara_id=KO92001004-00000021-0011

慶應義塾大学学術情報リポジトリ(KOARA)に掲載されているコンテンツの著作権は、それぞれの著作者、学会または出版社/発行者に帰属し、その権利は著作権法によって保護されています。引用にあたっては、著作権法を遵守してご利用ください。

The copyrights of content available on the Keio Associated Repository of Academic resources (KOARA) belong to the respective authors, academic societies, or publishers/issuers, and these rights are protected by the Japanese Copyright Act. When quoting the content, please follow the Japanese copyright act.

Systems biology strategy to regulate the proinflammatory response and enhance the cancer cell death

Graduate School of Media and Governance
Kentaro Hayashi

Abstract

Tumor or cancer immunology is a new and fast growing field where the interactions of the inherent immune system with malignant cancers have shown the suppression of disease progression. In this field, systems biology approach is required to understand and control the cellular response, since cellular behaviors are highly dynamic, complex and well orchestrated. This thesis describes the current understanding of the systems biology approach and addresses the connectivity between immunology and systems biology. The main aims of this research are i) to regulate the proinflammatory response in Tumor necrosis factor (TNF) signaling pathway and ii) to understand the resistance mechanisms for cancer treatment in TNF related apoptosis inducing ligand (TRAIL) signaling pathway. Therefore dynamical computational models were developed using the well-established perturbation response approach, and analyzed the dynamics of key signaling molecules and gene expressions were analyzed. Using this systems biology approach, a key molecule was identified to effectively regulate, but not abolish, the proinflammatory response in TNF signaling and we also found a target to enhance cell death in TRAIL resistant cancer cells. This work shows systems biology approach integrating computational approaches and wet bench experiments shed light on the drug development for the regulation of the immune-mediated diseases.

Keywords: TNF, TRAIL, Cell signaling, Computational model, Inflammation, Cancer, Apoptosis