疾患要因・癌予後 と関連する分子機能の解明
生体物質研究部門

産学連携の可能性と研究室からのメッセージ

○企業から受託できるテーマ：シグナル分子活性の検証、機能予測

人体を構成する個々の細胞は細胞膜で受容した増殖因子やホルモン等の刺激を細胞の内部で情報処理し適切な応答を行います。このシステムこそ細胞内多種多様な分子が連携する「シグナル伝達」と呼ばれる精密な仕組みです。近年、このシグナル伝達の異常が、癌や多くの病気の原因であることが証明されました。分子標的薬が臨床応用される昨今、シグナル伝達の研究は、病気の原因究明や新しい治療法の開発には欠かせないのです。病気をひき起こす異常なシグナル伝達の解明と共に、新しい治療法や疾患マーカーの開発などをめざし、日々、研鑽を続けています。

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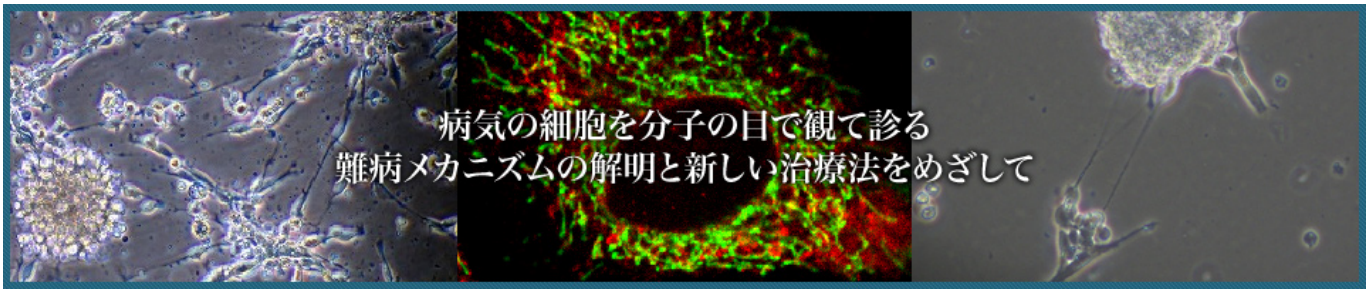
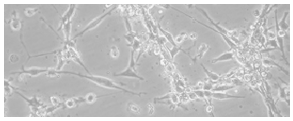


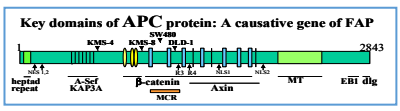
- プロテインキナーゼを中心とする細胞周期進行シグナル：
  家族性大腸腺腫症（FAP）原因遺伝子産物であるAPCタンパクがプロテインキナーゼCK2と相互作用する事、APCがCK2上流の制御因子であることを見出しました。さらに下流シグナル分子として、特定の時間軸にCK2が翻訳開始因子をリン酸化する事、ならびに細胞周期進行に関与する仕組みを明らかにしました。
- 増殖性疾患に関連するリン酸化シグナル変換の包括的解析：
  若年性希少疾患である濾胞性肝癌(FL-HCC)はプロテインキナーゼA（PKA）酵素活性部位融合による変異遺伝子, *DNAJB1-PKAC*, が原因であると考えられています。そこで遺伝子発現細胞系を用い癌化シグナルをリン酸化プロテオミクス手法により解析し、癌関連遺伝子へ至るパスウェイ同定を進めています。
- 癌予後と関連するマーカー分子の開発、その細胞内機能の解明：
  癌摘出術後に数ヶ月を経て組織への浸潤と転移等、癌が進展する病態を予防することは、生命活動ならびに生理機能を維持する為に大変重要です。現行の病期分類ならびに予後予測指標を超える、効果的かつ精密な、癌新規マーカーの開発を目指して、その生物学的機能解明と併せて研究を進めています。

○企業と組みたいテーマ：特許出願テーマに関連する商品化

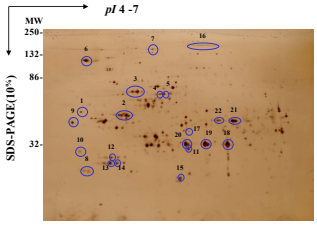
2019年特許出願済研究内容についてご興味ある企業との連携を希望します。研究倫理指針に基づき関連機関IRB承認を経て進めています。詳細は本学産学連携本部までお問い合わせください。



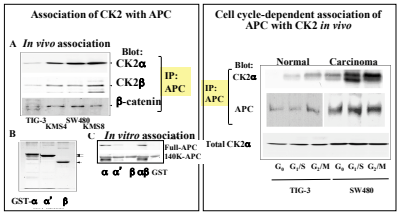
疾患由来細胞培養系の確立



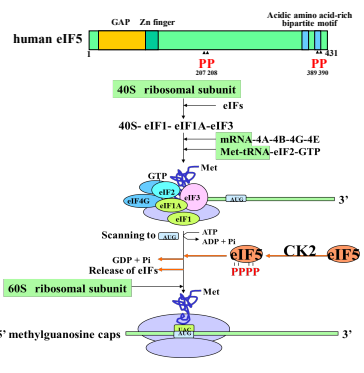
APC遺伝子の構造



核内CK2複合体：2次元電気泳動法による分離



CK2-APC相互作用は細胞周期に依存する



CK2によるeIF5リン酸化と翻訳開始因子機能相関図

［キーワード］　疾患メカニズム、細胞シグナル、リン酸化酵素（プロテインキナーゼ）、癌マーカー

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The Japanese Biochemical Society
Japan Human Proteome Organization
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The American Society for Pharmacology (Editorial Associate Board of *Molecular Pharmacology)*
Quantum Life Science Society

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Fukushima Medical University School of Medicine: Faculty's Award
Yamada Science Foundation
Nissan Science Foundation

Other links:

http://wwwb.cao.go.jp/yakuin/cor004/index/137

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2. Miwako K. Homma, Ryoya Mashiko, Yoshimi Homma. Alterations of intracellular signal transduction system in a rare liver carcinoma. The 78th Annual Meeting of Japan Cancer Association (Oral English Session) Kyoto Japan, 27 September 2019.
3. Miwako K. Homma, Yoshimi Homma. Phosphoproteomics analysis of nuclear protein kinase complexes associating with growth-related gene expressions. The 77th Annual Meeting of Japan Cancer Association (Oral English Session) Osaka Japan, 29 September 2018.
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6. Miwako K. Homma. Role of CK2 on cell cycle progression. University Washington and KOBE University International Joint Symposium (Invited), Kobe Japan, 15 December 2014.
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