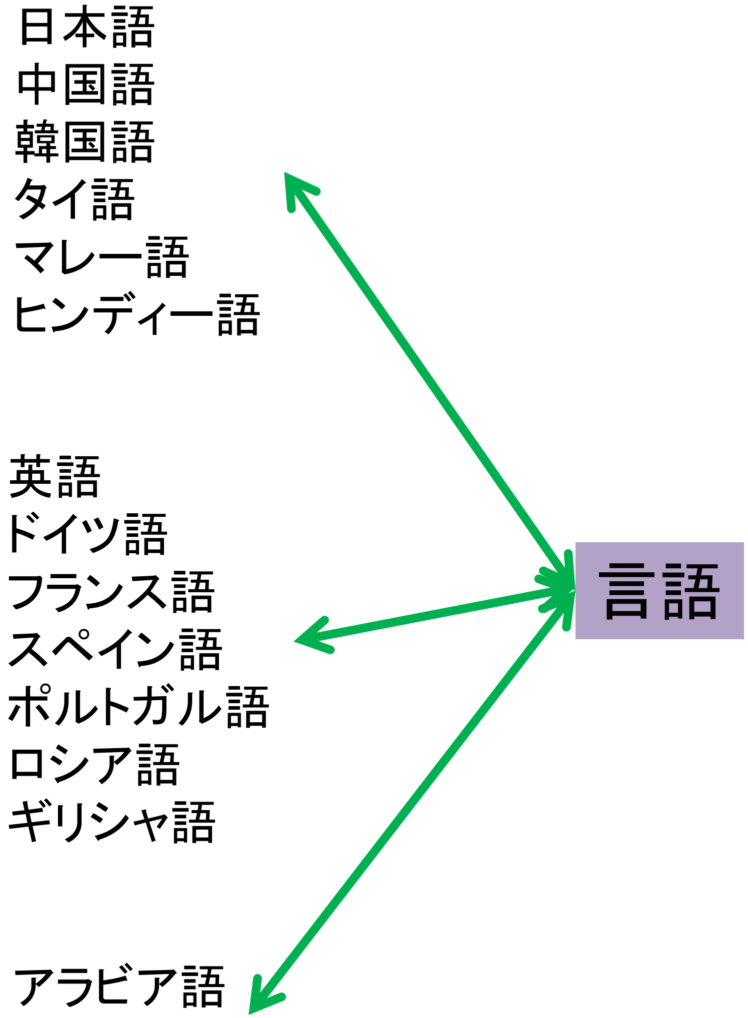
言語と情報

辻井潤一
理学部・情報科学
大学院・情報学環

背景



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韓国語
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マレー語
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ドイツ語
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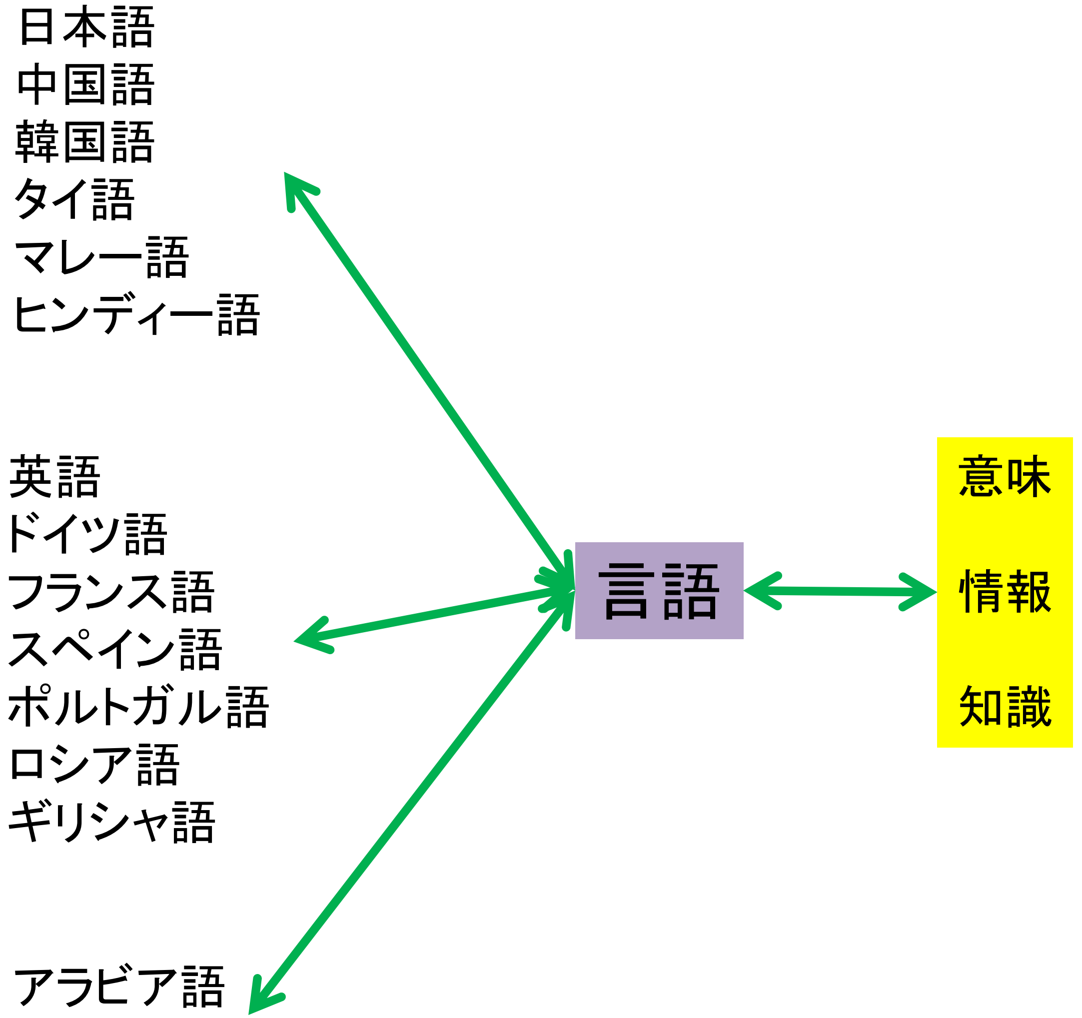
ロシア語
ギリシャ語
アラビア語
言語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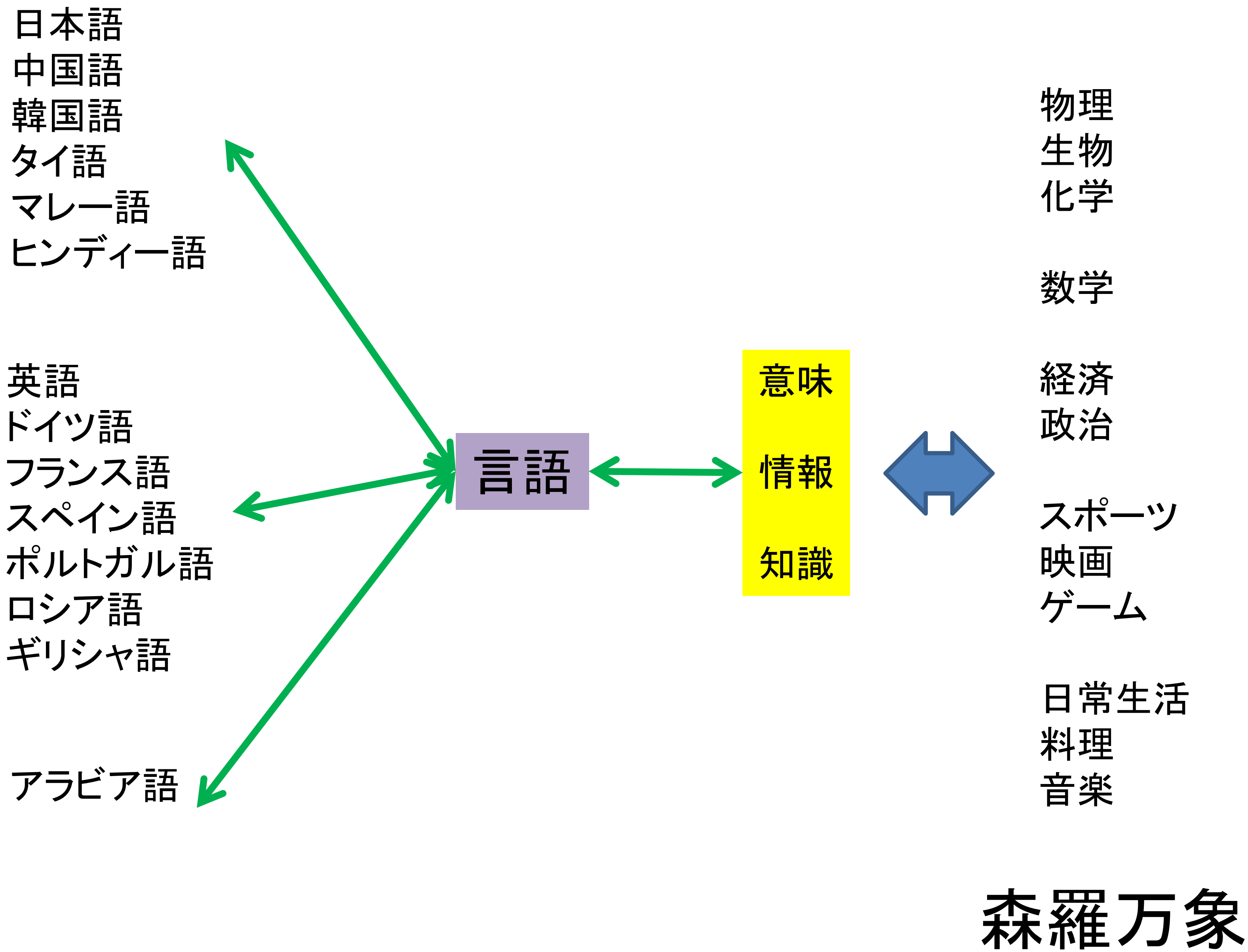
言語
意味
情報
知識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化学
数学
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映画
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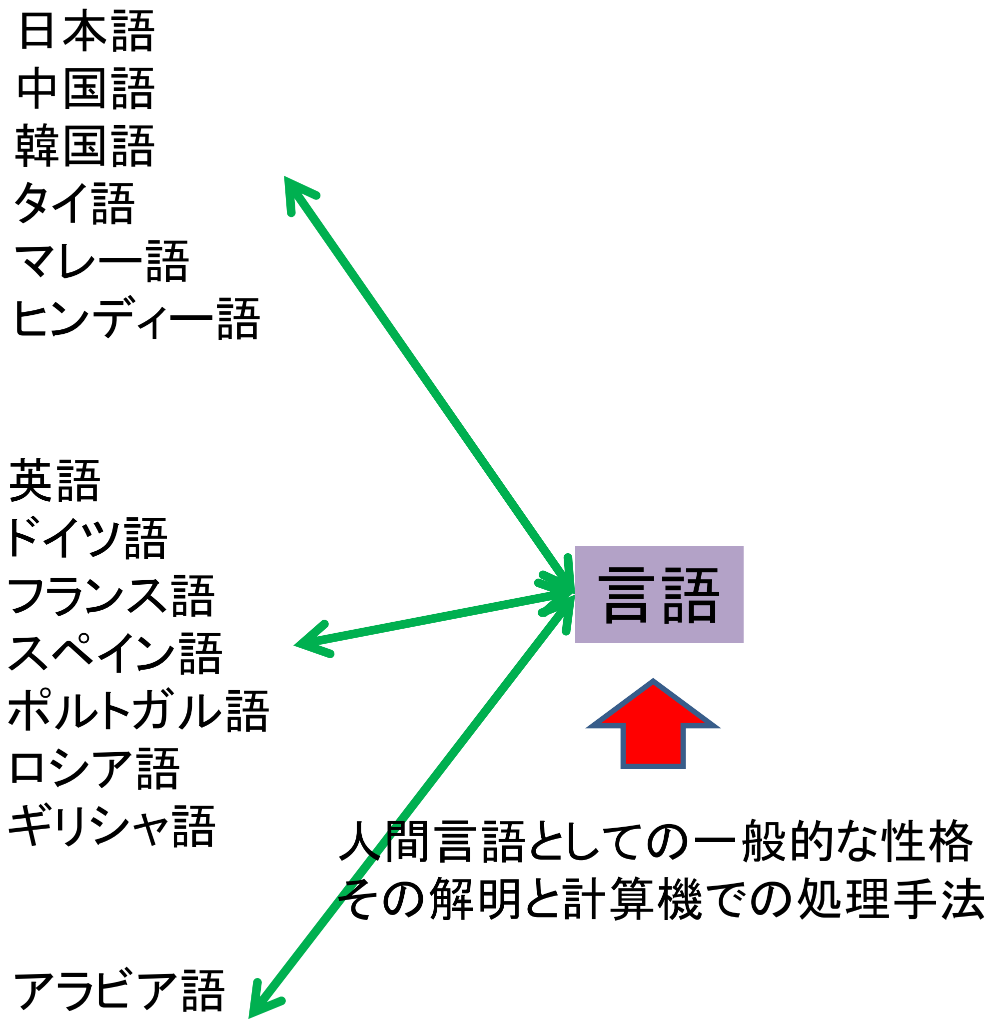
日常生活
料理
音楽
森羅万象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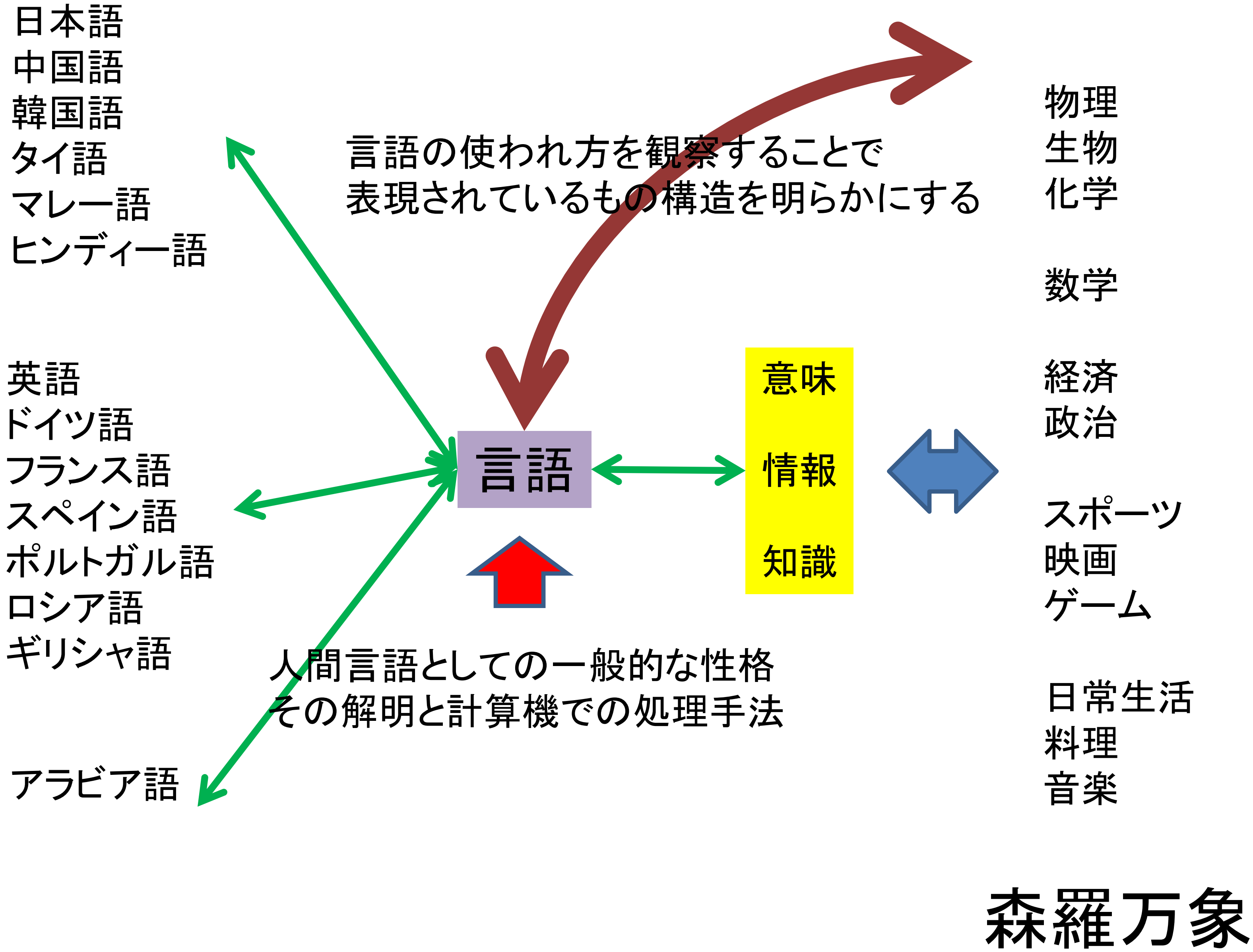
言語
人間言語としての一般的な性格
その解明と計算機での処理手法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アラビア語
言語の使われ方を観察することで
表現されているもの構造を明らかにする
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スポーツ
映画
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日常生活
料理
音楽
森羅万象

言語と（意味･文脈･記憶･構造･解釈）

- 幼児、絵本
- Bilingualの人
- 公正＝to be fair
- Freedom Fighters , Terrorists
- 遊び、甘えの構造

メディアとしての自然言語

- 認識、解釈、知識の表現手段
  - 画像:時空間の一点におけるインスタンス
  - 記号的な画像:平板な、単一のメッセージ
  - 自然言語:
    - インスタンスではない一般化 された認識、解釈
    - 情報の構造的な組み合わせ、論理的展開
- コミュニケーションの手段
  - コマンド言語:システムに固有、デザインの任意性
  - 自然言語:一般性、汎用性(バリアフリー)

自然言語の役割

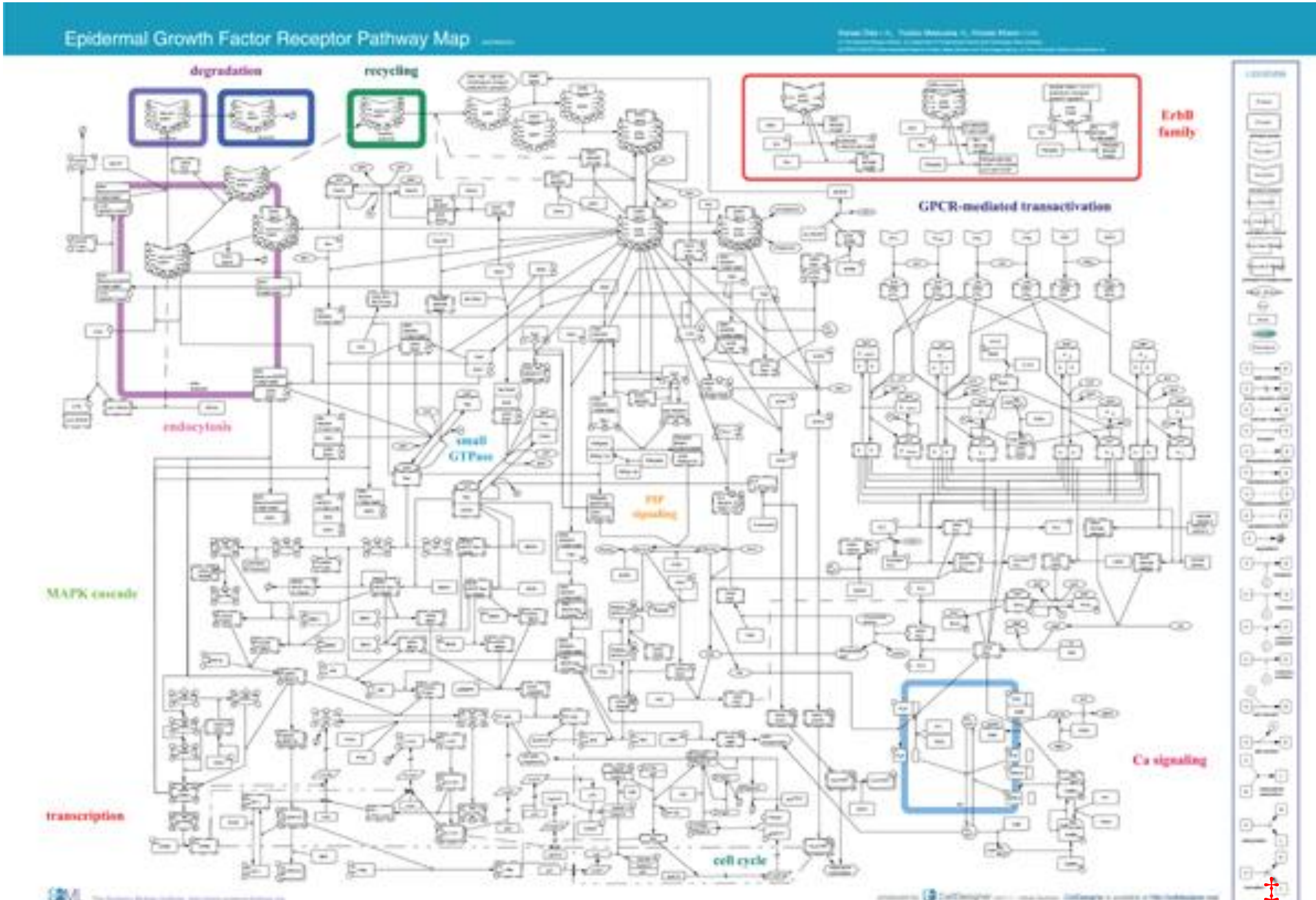
- 情報の統合、構造化による全体的な理解
- 異なる認識をもった知的エージェント間のコミュニケーション
- 多様なIT機器への普遍的な意思表示手段
- Knowledge Sharing、データベース統合
- 多メディアの一つ、多メディアの統合

例：情報の統合

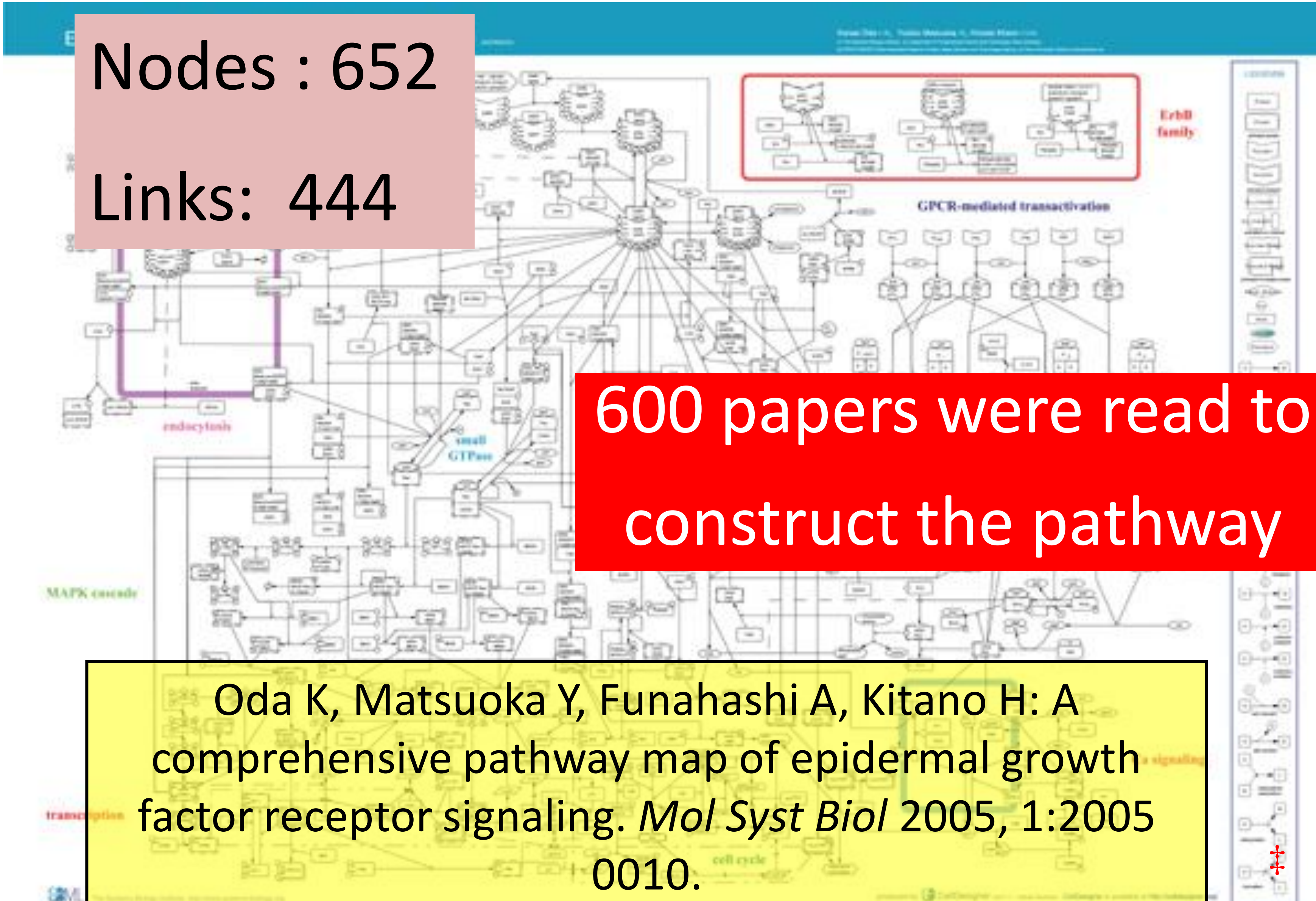
生命科学分野の情報統合

- DNAとタンパク質、生命現象の根底
- タンパク質の構造と機能
- 生命現象の理解:タンパク質間相互作用、ネットワークの理解

Toll-Like Receptor (TLR) pathway



Toll-Like Receptor (TLR) pathway



Nodes : 652

Links: 444

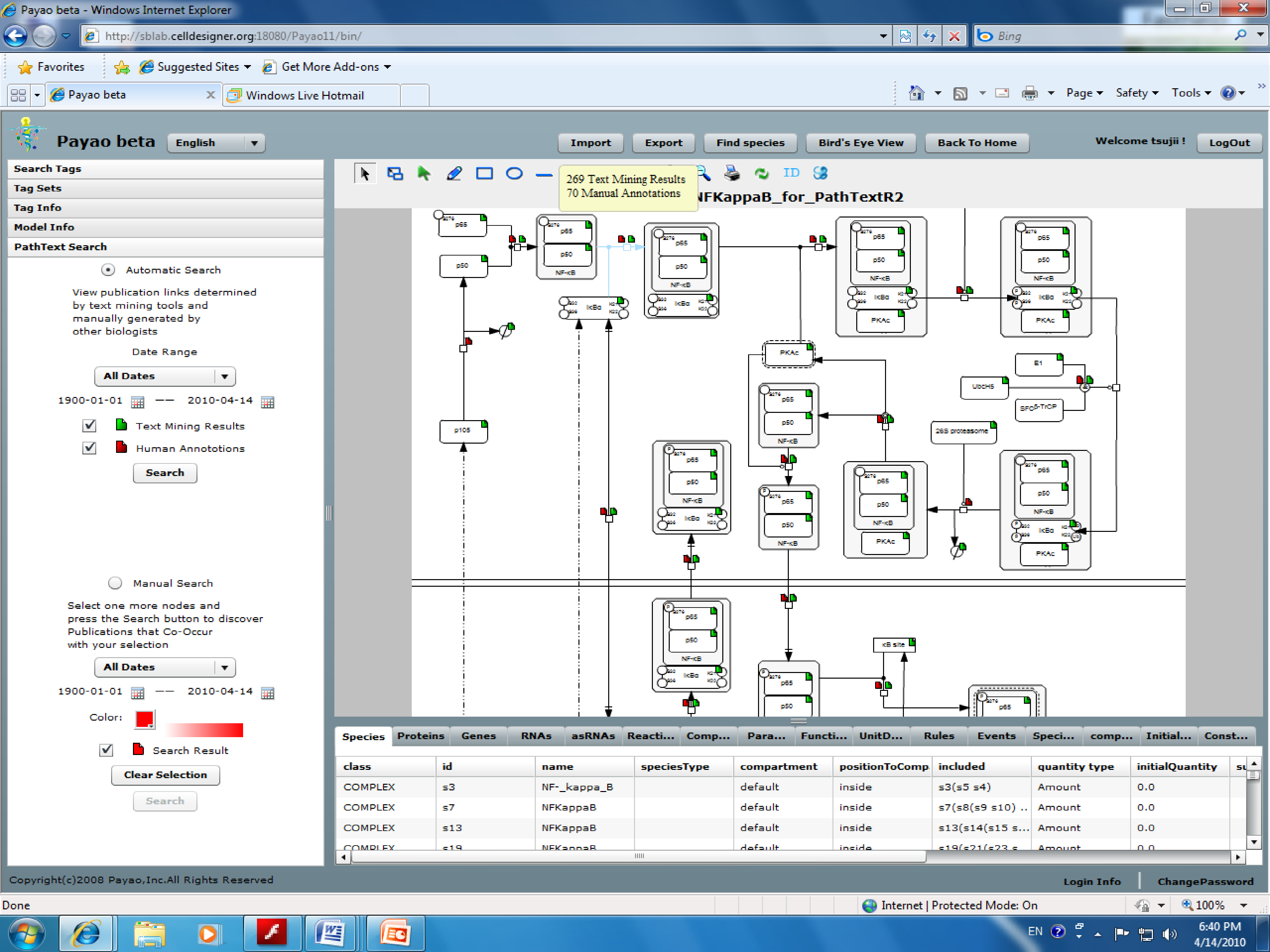
600 papers were read to construct the pathway

Oda K, Matsuoka Y, Funahashi A, Kitano H: A comprehensive pathway map of epidermal growth factor receptor signaling. *Mol Syst Biol* 2005, 1:2005 0010.

生命科学分野の情報統合

- DNAとタンパク質、生命現象の根底
- タンパク質の構造と機能
- 生命現象の理解：タンパク質間相互作用、ネットワークの理解
- 数十万種類のタンパク質
- 生命進化の過程、生物種間でのタンパク質の共用
- タンパク質の名前: freedom fightersとterrorists
- 多量の論文情報：MEDLINE,１８００万件、１年に５０万件、一日に１３００件以上

デモ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70 Manual Annotations
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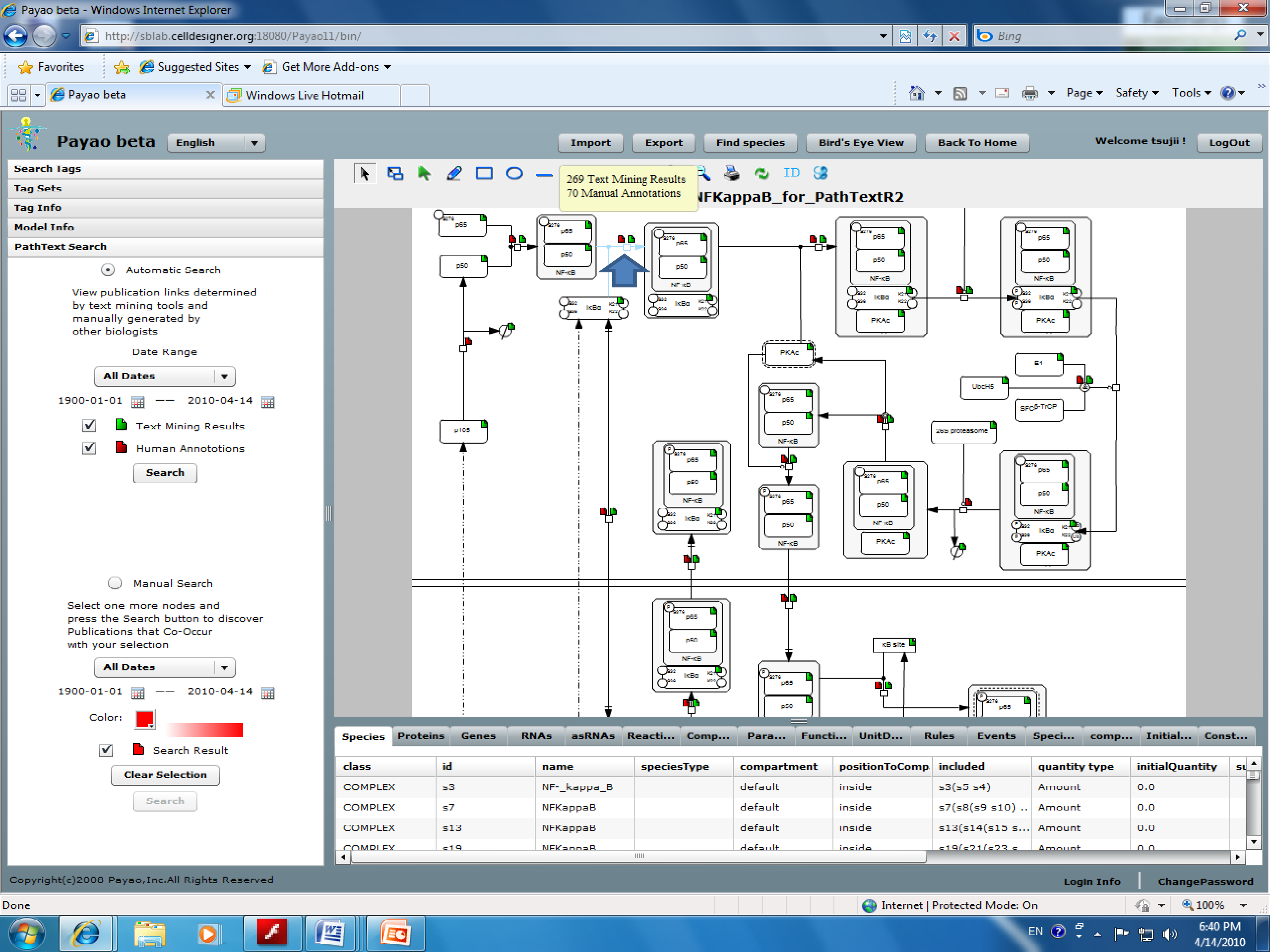
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Get More Add-ons
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Safety
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English
Import
Export
Find species
Bird's Eye View
Back To Home
Welcome tsujii !
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Search Tags
Tag Sets
Tag Info
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Automatic Search
View publication links determined by text mining tools and manually generated by other biologists
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70 Manual Annotations
NFKappaB_for_PathTextR2
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p50
NF-κB
IκBα
PKAc
p105
E1
UbcH5
SCFβ-TrCP
26S proteasome
κB site
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UnitD...
Rules
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6:40 PM
4/14/2010

PathText

Model: NFKappaB_for_PathTextR2
Node: NF-kappaB IkappaB alpha|bind|NFKappaB (re2)

Manual Annotations (70) | Medie Search Results (64) | Kleio Search Results (200) | About PathText

Prev | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Next

Ubiquitin-dependent degradation of IkappaBalpha is mediated by a ubiquitin ligase Skp1/Cul 1/F-box protein FWD1.
Journal: **Proceedings of the National Academy of Sciences of the United States of America** 1999 Mar 3096 73859-63 1 Annotation(s)

An N-terminal nuclear export signal is required for the nucleocytoplasmic shuttling of IkappaBalpha.
Journal: **The EMBO journal** 1999 Dec 118 236682-93 1 Annotation(s)

Cotranslational dimerization of the Rel homology domain of NF-kappaB1 generates p50-p105 heterodimers and is required for effective p50 production.
Journal: **The EMBO journal** 2000 Sep 119 174712-22 1 Annotation(s)

NF-kappaB-inducing kinase regulates the processing of NF-kappaB2 p100.
Journal: **Molecular cell** 2001 Feb 7 2401-9 1 Annotation(s)

Missing pieces in the NF-kappaB puzzle.
Journal: **Cell** 2002 Apr 109 Suppl S81-96 2 Annotation(s)

The precursor of NF-kappa B p50 has I kappa B-like functions.
Journal: **Cell** 1992 Oct 1671 2243-53 2 Annotation(s)

I kappa B/MAD-3 masks the nuclear localization signal of NF-kappa B p65 and requires the transactivation domain to inhibit NF-kappa B p65 DNA binding.
Journal: **Molecular biology of the cell** 1992 Dec 163 121339-52 2 Annotation(s)

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An N-terminal nuclear export signal is required for the nucleocytoplasmic shuttling of IkappaBalpha.
Journal: **The EMBO journal** 1999 Dec 118 236682-93 1 Annotation(s)

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Journal: **The EMBO journal** 2000 Sep 119 174712-22 1 Annotation(s)

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Model: NFKappaB_for_PathTextR2
Node: NF-kappaB IkappaB alpha|bind|NFKappaB (re2)

Ubiquitin-dependent degradation of IkappaBalpha is mediated by a ubiquitin ligase Skp1/Cul 1/F-box protein FWD1.

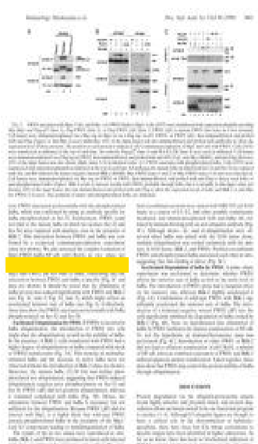
Journal: **Proceedings of the National Academy of Sciences of the United States of America** 1999 Mar 3096 73859-63 1 Annotation(s)

Authors: Hatakeyama S, Kitagawa M, Nakayama K, Shirane M, Matsumoto M, Hattori K, Higashi H, Nakano H, Okumura K, Onoé K, Good RA, Nakayama K.

PubMed: 10097128 View PubMed Page

Publication Abstract

Activation of the transcription factor nuclear factor kappa B (NF-kappaB) is controlled by proteolysis of its inhibitory subunit (IkappaB) via the ubiquitin-proteasome pathway. Signal-induced phosphorylation of IkappaBalpha by a large multisubunit complex containing IkappaB kinases is a prerequisite for ubiquitination. Here, we show that FWD1 (a mouse homologue of Slimb/betaTrCP), a member of the F-box/WD40-repeat proteins, is associated specifically with IkappaBalpha only when IkappaBalpha is phosphorylated. The introduction of FWD1 into cells significantly promotes ubiquitination and degradation of IkappaBalpha in concert with IkappaB kinases, resulting in nuclear translocation of NF-kappaB. In addition, FWD1 strikingly evoked the ubiquitination of IkappaBalpha in the in vitro system. In contrast, a dominant-negative form of FWD1 inhibits the ubiquitination, leading to stabilization of IkappaBalpha. These results suggest that the substrate-specific degradation of IkappaBalpha is mediated by a Skp1/Cull 1/F-box protein (SCF) FWD1 ubiquitin-ligase complex and that FWD1 serves as an intracellular receptor for phosphorylated IkappaBalpha. Skp1/Cullin/F-box protein FWD1 might play a critical role in transcriptional regulation of NF-kappaB through control of IkappaB protein stability.



Annotation by Kanae Oda
Hence, FWD1 binds to IkBa when it is complexed with NF-kB.

Page: 3

An N-terminal nuclear export signal is required for the nucleocytoplasmic shuttling of IkappaBalpha

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Journal: **Molecular biology of the cell** 1992 Dec 163 121339-52 2 Annotation(s)

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I kappa B/MAD-3 masks the nuclear localization signal of NF-kappa B p65 and requires the transactivation domain to inhibit NF-kappa B p65 DNA binding.

Journal: **Molecular biology of the cell** 1992 Dec 163 121339-52 2 Annotation(s)

Authors: Ganchi PA, Sun SC, Greene WC, Ballard DW.

PubMed: 1493333 View PubMed Page

Publication Abstract

The active nuclear form of the NF-kappa B transcription factor complex is composed of two DNA binding subunits, NF-kappa B p65 and NF-kappa B p50, both of which share extensive N-terminal sequence homology with the v-rel oncogene product. The NF-kappa B p65 subunit provides the transactivation activity in this complex and serves as an intracellular receptor for a cytoplasmic inhibitor of NF-kappa B, termed I kappa B. In contrast, NF-kappa B p50 alone fails to stimulate kappa B-directed transcription, and based on prior in vitro studies, is not directly regulated by I kappa B. To investigate the molecular basis for the critical regulatory interaction between NF-kappa B and I kappa B/MAD-3, a series of human NF-kappa B p65 mutants was identified that functionally segregated DNA binding, I kappa B-mediated inhibition, and I kappa B-induced nuclear exclusion of this transcription factor. Results from in vivo expression studies performed with these NF-kappa B p65 mutants revealed the following: 1) I kappa B/MAD-3 completely inhibits NF-kappa B p65-dependent transcriptional activation mediated through the human immunodeficiency virus type 1 kappa B enhancer in human T lymphocytes, 2) the binding of I kappa B/MAD-3 to NF-kappa B p65 is sufficient to retarget NF-kappa B p65 from the nucleus to the cytoplasm, 3) selective deletion of the functional nuclear localization signal present in the Rel homology domain of NF-kappa B p65 disrupts its ability to engage I kappa B/MAD-3, and 4) the unique C-terminus of NF-kappa B p65 attenuates its own nuclear localization and contains sequences that are required for I kappa B-mediated inhibition of NF-kappa B p65 DNA binding activity. Together, these findings suggest that the nuclear localization signal and transactivation domain of NF-kappa B p65 constitute a bipartite system that is critically involved in the inhibitory function of I kappa B/MAD-3. Unexpectedly, our in vivo studies also demonstrate that I kappa B/MAD-3 binds directly to NF-kappa B p50. This interaction is functional as it leads to retargeting of NF-kappa B p50 from the nucleus to the cytoplasm. However, no loss of DNA binding activity is observed, presumably reflecting the unique C-terminal domain that is distinct from that present in NF-kappa B p65.

Annotation by Kanae Oda

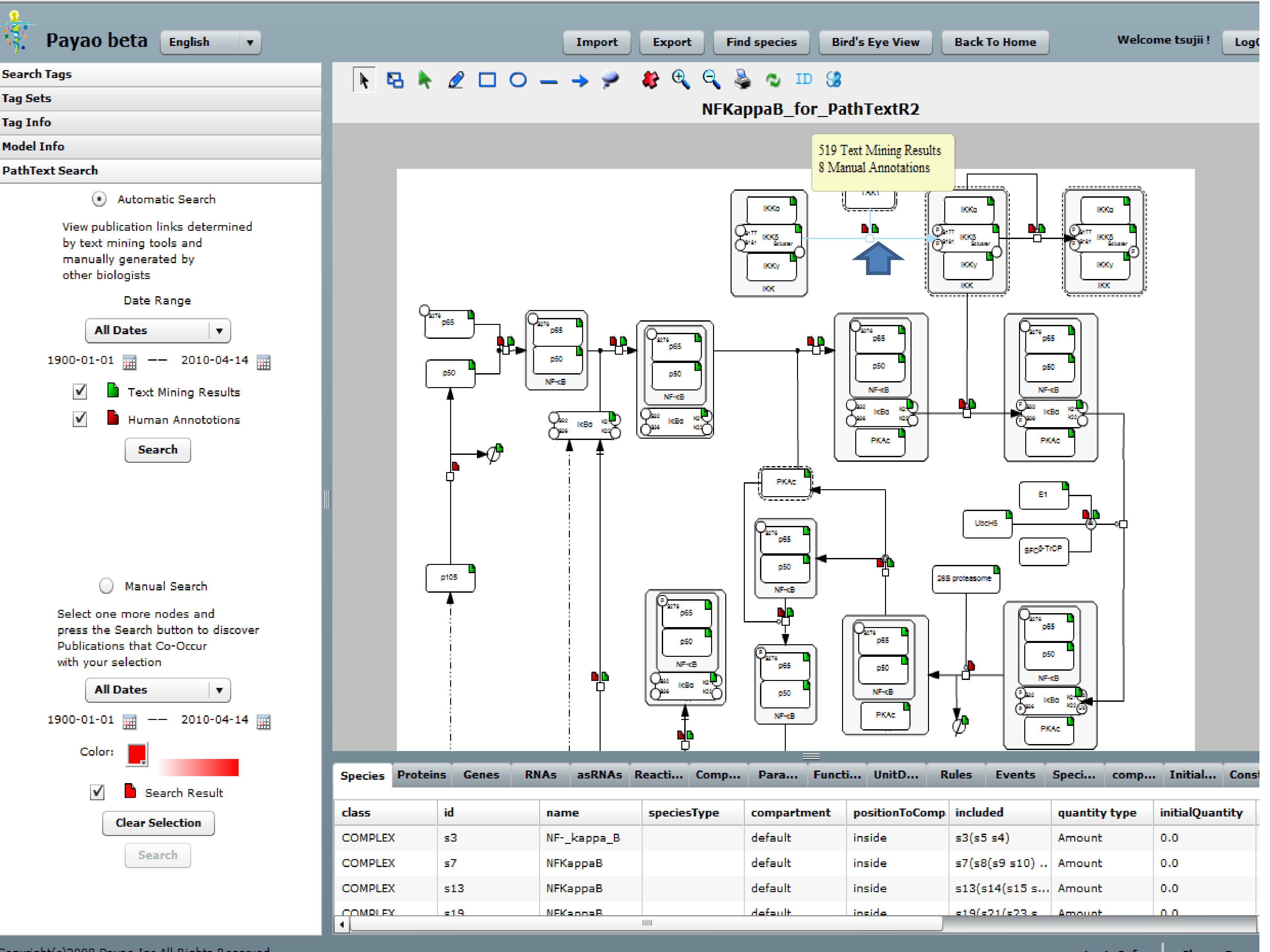
The NF-KB p65 subunit provides the transactivation activity in this complex and serves as an intracellular receptor for a cytoplasmic inhibitor of NF-KB, termed IKB.

Page: 1

Annotation by Kanae Oda

These studies clearly demonstrate that NF-KB p65 contains two domains that function in concert to mediate assembly with IKB/MAD-3, resulting in the inhibition of NF-KB p65 DNA binding activity.

Page: 2



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PathText

Model: NFKappaB_for_PathTextR2
Node: TAK1|phosphorylate|IKK (re5)

Manual Annotations (8) | **Medie Search Results (43)** | Kleio Search Results (475) | About PathText

Prev 1 2 3 4 5 Next

Inhibition of inhibitor of nuclear factor-kappaB phosphorylation increases the efficacy of paclitaxel in in vitro and in vivo ovarian cancer models.
Journal: **Clinical cancer research : an official journal of the American Association for Cancer Research** 2004 Nov 1510 227645-54

Histamine H1 receptor antagonist blocks histamine-induced proinflammatory cytokine production through inhibition of Ca2+-dependent protein kinase C, Raf/MEK/ERK and IKK/I kappa B/NF-kappa B signal cascades.
Journal: **Biochemical pharmacology** 2005 Feb 169 3433-49

Inhibition of inhibitor of nuclear factor-kappaB phosphorylation increases the efficacy of paclitaxel in in vitro and in vivo ovarian cancer models.
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Tea polyphenol epigallocatechin 3-gallate impedes the anti-apoptotic effects of low-grade repetitive stress through inhibition of Akt and NFkappaB survival pathways.
Journal: **FEBS letters** 2006 Jan 9580 1278-84

Pertussis toxin-sensitive Gi/o proteins are involved in nerve growth factor-induced pro-survival Akt signaling cascade in PC12 cells.
Journal: **Cellular signalling** 2005 Jul 17 7881-90

Propofol inhibits lipoteichoic acid-induced iNOS gene expression in macrophages possibly through downregulation of toll-like receptor 2-mediated activation of Raf-MEK1/2-ERK1/2-IKK-NFkappaB.
Journal: **Chemico-biological interactions** 2009 Oct 30181 3430-9

Activation of p21-activated kinase 1-nuclear factor kappaB signaling by Kaposi's sarcoma-associated herpes virus G protein-coupled receptor during cellular transformation.
Journal: **Cancer research** 2003 Dec 1563 248837-47

Formyl peptide-receptor like-1 requires lipid raft and extracellular signal-regulated protein kinase to activate inhibitor-kappa B kinase in human U87 astrocytoma cells.
Journal: **Journal of neurochemistry** 2007 Nov 103 41553-66

Activation of p38MAPK by repetitive low-grade oxidative stress leads to pro-survival effects.
Journal: **Biochimica et biophysica acta** 2007 Mar 1773 3367-74

Thalidomide suppresses the interleukin 1beta-induced NFkappaB signaling pathway in colon cancer cells.
Journal: **Annals of the New York Academy of Sciences** 2002 Nov 973 414-8

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Model: NFKappaB_for_PathTextR2
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Journal: **Cellular signalling** 2005 Jul 17 7881-90

Propofol inhibits lipoteichoic acid-induced iNOS gene expression in macrophages possibly through downregulation of toll-like receptor 2-mediated activation of Raf-MEK1/2-ERK1/2-IKK-NFkappaB.
Journal: **Chemico-biological interactions** 2009 Oct 30181 3430-9

Activation of p21-activated kinase 1-nuclear factor kappaB signaling by Kaposi's sarcoma-associated herpes virus G protein-coupled receptor during cellular transformation.
Journal: **Cancer research** 2003 Dec 1563 248837-47

Formyl peptide-receptor like-1 requires lipid raft and extracellular signal-regulated protein kinase to activate inhibitor-kappa B kinase in human U87 astrocytoma cells.
Journal: **Journal of neurochemistry** 2007 Nov 103 41553-66

Activation of p38MAPK by repetitive low-grade oxidative stress leads to pro-survival effects.
Journal: **Biochimica et biophysica acta** 2007 Mar 1773 3367-74

Thalidomide suppresses the interleukin 1beta-induced NFkappaB signaling pathway in colon cancer cells.
Journal: **Annals of the New York Academy of Sciences** 2002 Nov 973 414-8

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http://www.monrovian.com/pathtext_results/index.php?model=NFKappaB_for_PathTextR2&node=re5&start=19000101&end=20100414&selected:

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Inhibition of inhibitor of nuclear factor-kappaB phosphorylation increases the efficacy of paclitaxel in in vitro and in vivo ovarian cancer models.
Journal: **Clinical cancer research : an official journal of the American Association for Cancer Research** 2004 Nov 1510 227645-54

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Authors: S Mabuchi, M Ohmichi, Y Nishio, T Hayasaka, A Kimura, T Ohta, J Kawagoe, K Takahashi, N Yada-Hashimoto, H Seino-Noda, M Sakata, T Motoyama, H Kurachi, JR Testa, K Tasaka, Y Murata
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Medie Annotation
Treatment of paclitaxel-sensitive Caov-3 cells with paclitaxel transiently activated the phosphorylation of Akt, the phosphorylation of IkappaB kinase (IKK), and the phosphorylation of inhibitor of NFkappaB (IkappaBalpha).
Subject Verb Object

Publication Abstract
We investigated whether inhibition of nuclear factor-kappaB (NFkappaB) increases the efficacy of paclitaxel in in vitro and in vivo ovarian cancer models. Treatment of paclitaxel-sensitive Caov-3 cells with paclitaxel transiently activated the phosphorylation of Akt, the phosphorylation of IkappaB kinase (IKK), and the phosphorylation of inhibitor of NFkappaB (IkappaBalpha). Paclitaxel also caused a transient increase in NFkappaB activity, followed by a decrease in NFkappaB activity. We show an association between Akt and IKK and show that the phosphorylation of IKK induced by paclitaxel is blocked by treatment with a phosphatidylinositol 3-kinase inhibitor (wortmannin or LY294002). Furthermore, interference of the Akt signaling cascade inhibits the transient induction of IkappaBalpha phosphorylation and NFkappaB activity by paclitaxel. Inhibition of NFkappaB activity by treatment with an IkappaBalpha phosphorylation inhibitor (BAY 11-7085) attenuated both basal and transient induction of IkappaBalpha phosphorylation by paclitaxel. Treatment with BAY 11-7085 also enhanced the inhibition of NFkappaB activity by paclitaxel for up to 24 hours. In addition, treatment with BAY 11-7085 decreased the viability of cells treated with paclitaxel. Moreover, treatment with BAY 11-7085 increased the efficacy of paclitaxel-induced inhibition of intraabdominal dissemination and production of ascites in athymic nude mice inoculated intraperitoneally with Caov-3 cells. These results suggest that paclitaxel transiently induces NFkappaB activity via the phosphatidylinositol 3-kinase/Akt cascade and that combination therapy with paclitaxel and an NFkappaB inhibitor would increase the therapeutic efficacy of paclitaxel.

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Histamine H1 receptor antagonist blocks histamine-induced proinflammatory cytokine production through inhibition of Ca2+-dependent protein kinase C, Raf/MEK/ERK and IKK/I kappa B/NF-kappa B signal cascades.
Journal: **Biochemical pharmacology** 2005 Feb 169 3433-49

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一般論：情報技術は何を変革しつつあるか？

言語による情報伝達の変遷

- 写本による情報の伝達
- 手描きのテキストの回覧と書き込み
- 細分化されたグループの中での情報共有

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- 計算機・ネットワーク
- 情報発信の分散化
- 情報の蓄積（アーカイブ）、加工、表示

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印刷されたテキスト

電子的に**作成、蓄積、加工、流通**されるテキスト

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ヨハネス・グーテンベルク

出典: フリー百科事典『ウィキペディア（Wikipedia）』

ヨハネス・グーテンベルク（Johannes Gensfleisch zur Laden zum Gutenberg, 1398年ごろ-1468年2月3日）はドイツ出身の金属加工職人。1445年頃に活版印刷術を発明[1][2][3]。1455年に初めて旧約・新約聖書（ラテン語版）を印刷したことで知られる。これが『グーテンベルク聖書』である。グーテンベルクの開発した印刷システムは急速に普及して、大量の印刷物を生み出し、ルネサンス期における情報伝播の速度を飛躍的に向上された。

印刷技術は羅針盤、火薬とともに「ルネサンス三大発明」の一つにあげられる。「活版印刷の発明者」としてグーテンベルクは現在でも人気があり、1999年にA&Eネットワークが選定した「紀元1000年代の人」ランキングで一位に選ばれているほどである[4]。

目次 [非表示]

生涯 [編集]

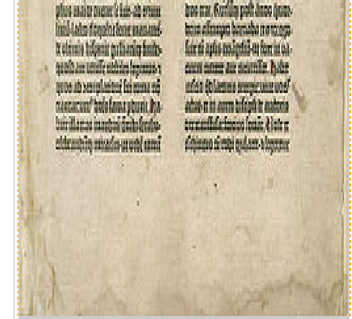
グーテンベルクはドイツのマインツの貴族の家系に生まれた。父はフリーレ・ゲンスフライシュ・ツア・ラーデン、母はエルゼ・ヴューリヒであった。父フリーレが1427年ごろにグーテンベルク屋敷と呼ばれた住居を手にいれて、そこで暮らしたことから、一族は以降「ツム・グーテンベルク」という名前も名乗るようになる。13世紀以降、グーテンベルク一族は冶金業と商業に従事していた。父母の間には長男フリーレ（後に市参事会員）、長女エルゼが生まれ、次男として生まれたのがヨハネスであった。（グーテンベルクの人生についてはほとんど知られていなかったが、19世紀にアロイス・キュッペル（Aloys Küppel）博士が初めて本格的な研究を行い、以降、教会や市の記録をもとにしてグーテンベルク一族の研究が進

『ドナトゥス文法書』(1454年) 中世から近代に至るまでもっともよく用いられたラテン語文法書。4世紀のローマ人でヒエロニムスの師であったアエリウス・ドナトゥス(Aelius Donatus)の著作。

『贖宥状』(1454年) 三十行。ニコラウス5世がトルコへの戦いに功あるものに示したもの。

『四十二行聖書』(1455年) いわゆる『グーテンベルク聖書』。180部ほど印刷された。

『マインツ詩篇』(1457年) コロフォンにはグーテンベルクの名前はないが、計画の途中までかかわっていたと考えられている。



四十二行聖書の冒頭 ヒエロニムスの書簡

グーテンベルクが自らの工房で印刷していたものとして以下のものがあげられる。

『贖宥状』(1454年) 三十一行。ニコラウス5世によるもの。

『トルコ暦』(1454年) トルコに対する戦いへの協力をよびかける教皇ニコラウス5世の書簡。

『トルコ教書』(1456年) トルコに対する戦いへの協力をよびかける教皇カリストゥス3世の書簡。

『医事暦』(1456年) 一種のカレンダー。

『キシアヌス』(1456年)ドイツにおけるカトリック教会の祝祭日を記した暦。

『カトリコン』(1460年) 1286年のヨハネス・バルブスの著作。ラテン語文法書とラテン語辞書を組み合わせたもの。

『信仰大全』(1460年) トマス・アクィナスの著作。

『贖宥状』(1461年) ピウス2世のもの。十五行および十八行。

十二行聖書』はユネスコの推進する歴史的記録遺産のデジタル化計画『世界の記憶』プロジェクトに加えられた。

ーテンベルクの影響 [編集]

テンベルクが発明した活版印刷技術は急速に普及し、ニュースや書籍の流通速度を劇的に速めた。印刷技術はルネサンスの拡大につながり、ひいては科学革命の土台を作ったとみなされる。またギリシャやローマの古典書が大量に刷され出回った。もっとも多かったのはギリシャ語、ラテン語聖書であった。これらの書物が研究されたことが宗教改革にいたる地下水脈の一つになっていく。15世紀中に金属活字を用いて印刷された書物は現存数も少ない大変貴重なも「インキュナブラ」と呼ばれている。

15世紀になると、聖書はグーテンベルグの発明した印刷機によって大量に、しかも正確に印刷され、さらに世界各国の言葉で印刷されるようになりました。グーテンベルグの印刷機で大量に印刷されたドイツ語やフランス語の聖書は、それまでそれぞれの地域でつかわれていた「方言」を標準化し、現代のドイツ語、フランス語の基礎ができました。こうしてグーテンベルグの印刷機が、ルネサンスなど文化の基盤を作り、近代への扉を開くことになったのです。

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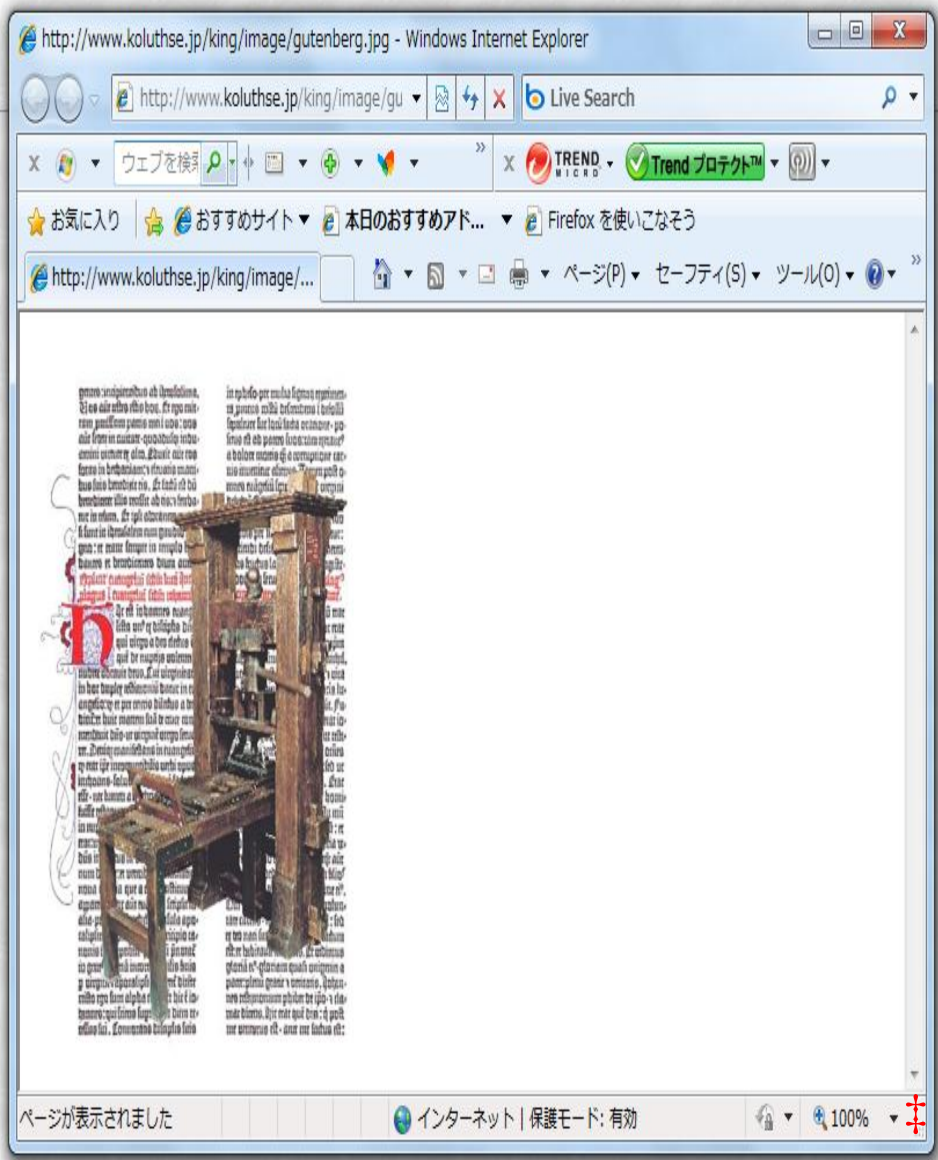
グーテンベルグ印刷機 復刻機



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手書きの私的なテキスト(日記）

つぶやき, 会話

Marshall McLuhan

From Wikipedia, the free encyclopedia

"McLuhan" redirects here. For the son of Marshall McLuhan, see Eric McLuhan.

Marshall McLuhan

Marshall McLuhan in the early 1970s

Born	Herbert Marshall McLuhan July 21, 1911 Edmonton, Alberta
Died	December 31, 1980 (aged 69) Toronto, Ontario
Main interests	media theory

Herbert Marshall McLuhan, CC (July 21, 1911 – December 31, 1980) was a Canadian educator, philosopher, and scholar—a professor of English literature, a literary critic, a rhetorician, and a communication theorist. McLuhan's work is viewed as one of the cornerstones of the study of media theory.

McLuhan is known for the expressions "the medium is the message" and "global village". McLuhan was a fixture in media discourse from the late 1960s to his death and he continues to be an influential and controversial figure. More than ten years after his death he was named the "patron saint" of *Wired* magazine.

Contents [hide]

Though the World Wide Web was invented thirty years after *The Gutenberg Galaxy* was published, McLuhan may have coined and certainly popularized the usage of the term "surfing" to refer to rapid, irregular and multidirectional movement through a heterogeneous body of documents or knowledge, e.g., statements like "Heidegger surf-boards along on the electronic wave as triumphantly as Descartes rode the mechanical wave." Paul Levinson's 1999 book *Digital McLuhan* explores the ways that McLuhan's work can be better understood through the lens of the digital revolution.[36] Later, Bill Stewart's 2007 "Living Internet" website describes how McLuhan's "insights made the concept of a global village, interconnected by an electronic nervous system, part of our popular culture well before it actually happened."[37]

Wikipedia : Marshall McLuhanの項より

WWWが発明されるのは、マクルーハンの著書The Gutenberg Galaxyが出版されてから30年後になるが、多種多様な文書や知識の間を素早く、不規則で多方向に動きまわることを指すのにsurfingという言葉を最初に使ったのは彼であった可能性があるし、この言葉を広げたのに大きな役割を果たした、たとえば、。。。。

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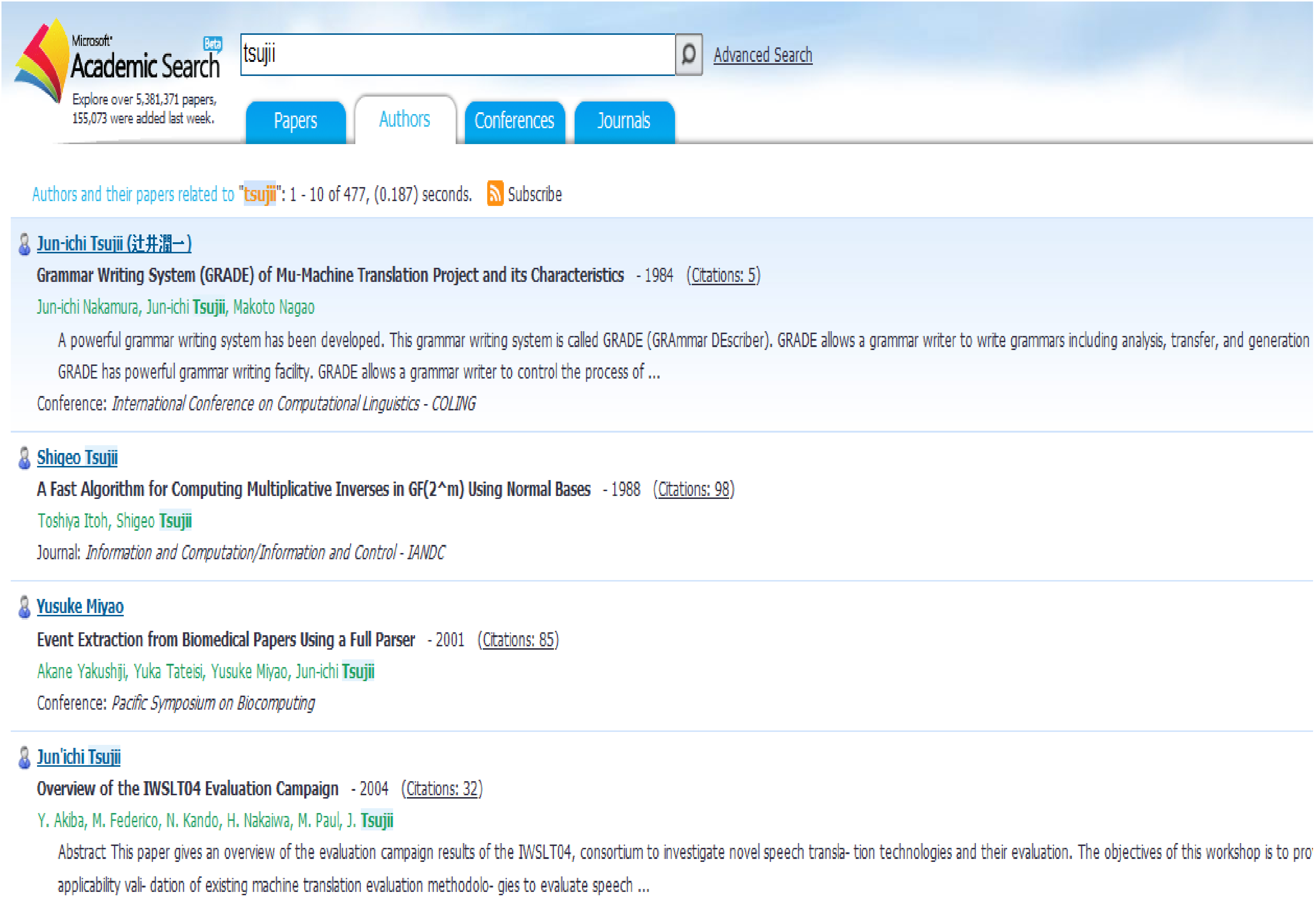

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Jun-ichi Nakamura, Jun-ichi Tsujii, Makoto Nagao

A powerful grammar writing system has been developed. This grammar writing system is called GRADE (GRAmmar DEscriber). GRADE allows a grammar writer to write grammars including analysis, transfer, and generation GRADE has powerful grammar writing facility. GRADE allows a grammar writer to control the process of ...

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Y. Akiba, M. Federico, N. Kando, H. Nakaiwa, M. Paul, J. Tsujii

Abstract This paper gives an overview of the evaluation campaign results of the IWSLT04, consortium to investigate novel speech transla- tion technologies and their evaluation. The objectives of this workshop is to pro applicability vali- dation of existing machine translation evaluation methodolo- gies to evaluate speech ...

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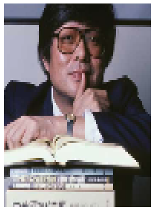

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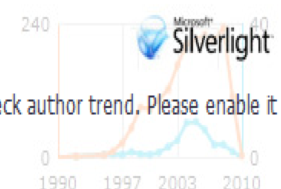

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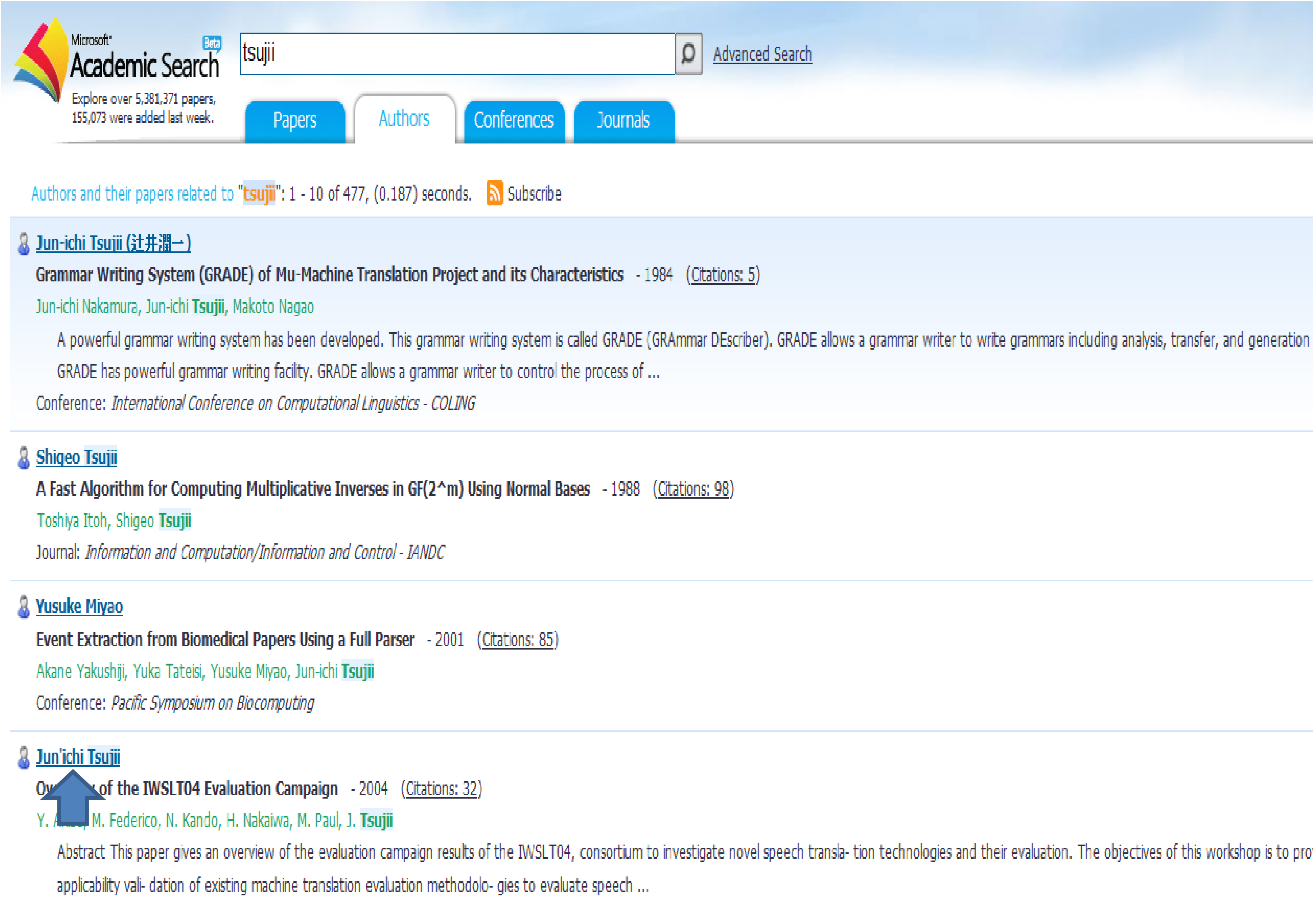

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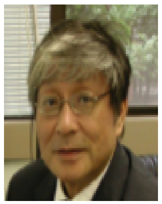

Jun'ichi Tsujii

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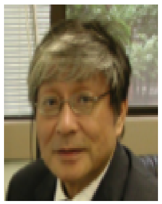

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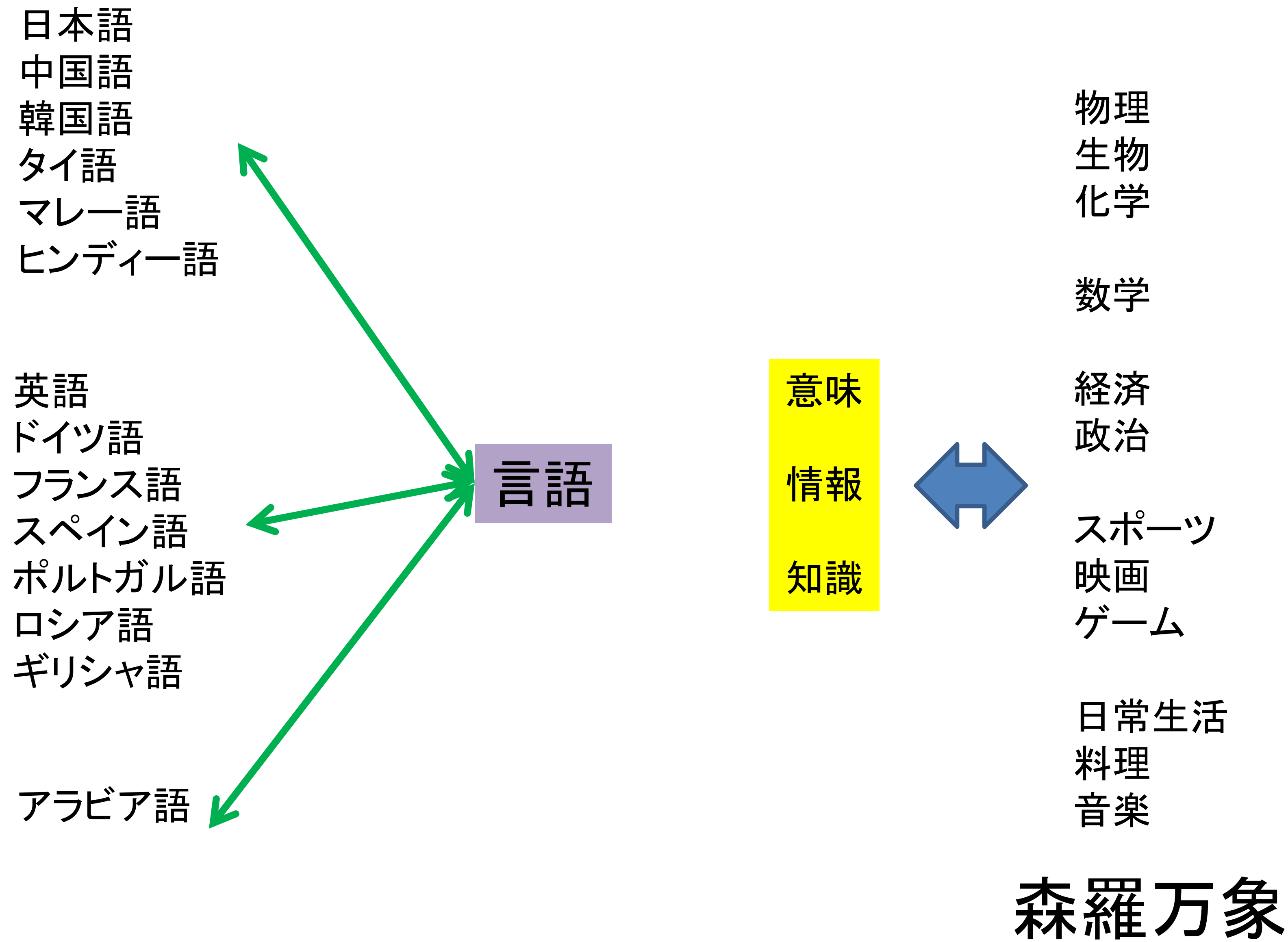
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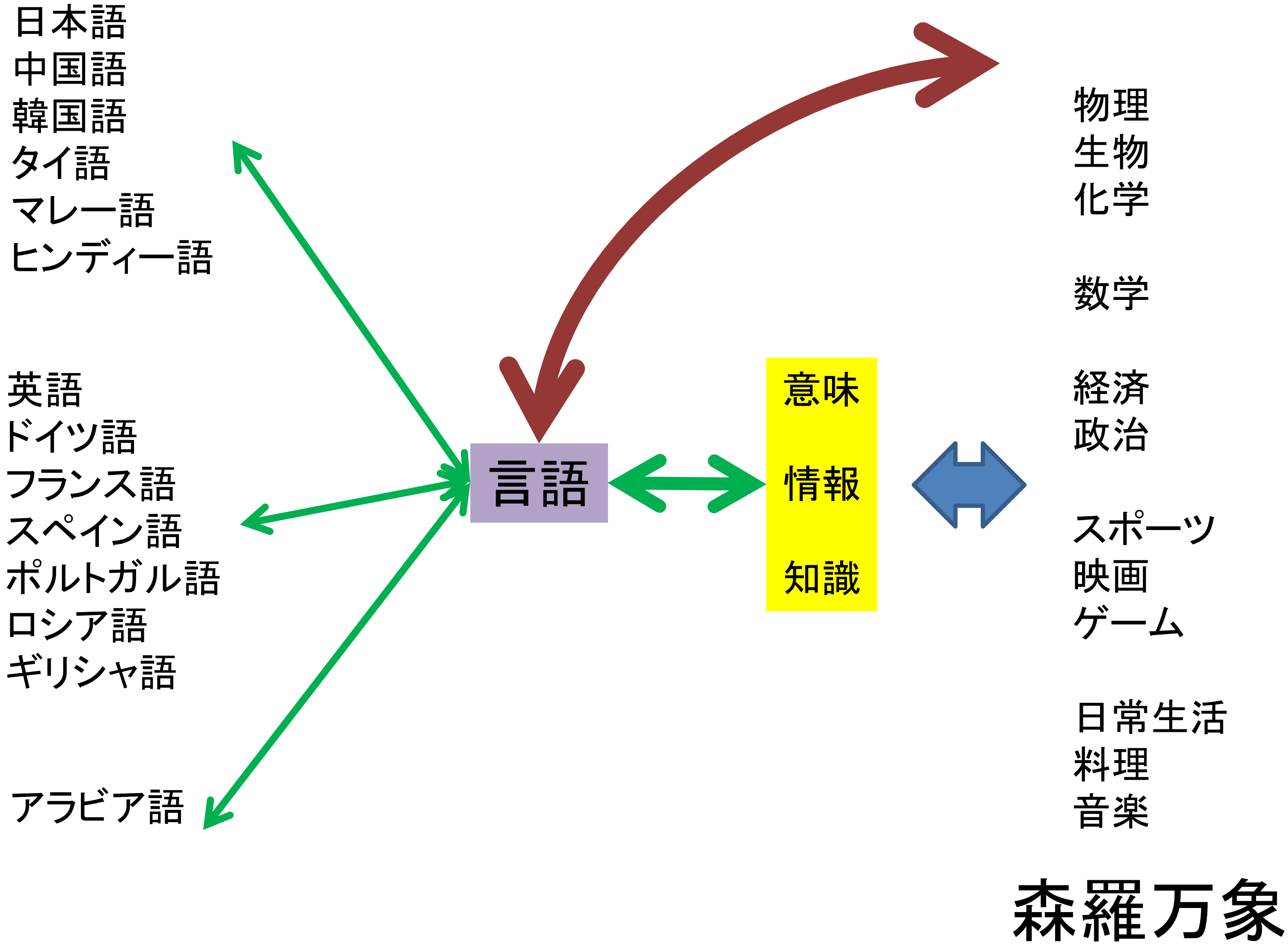
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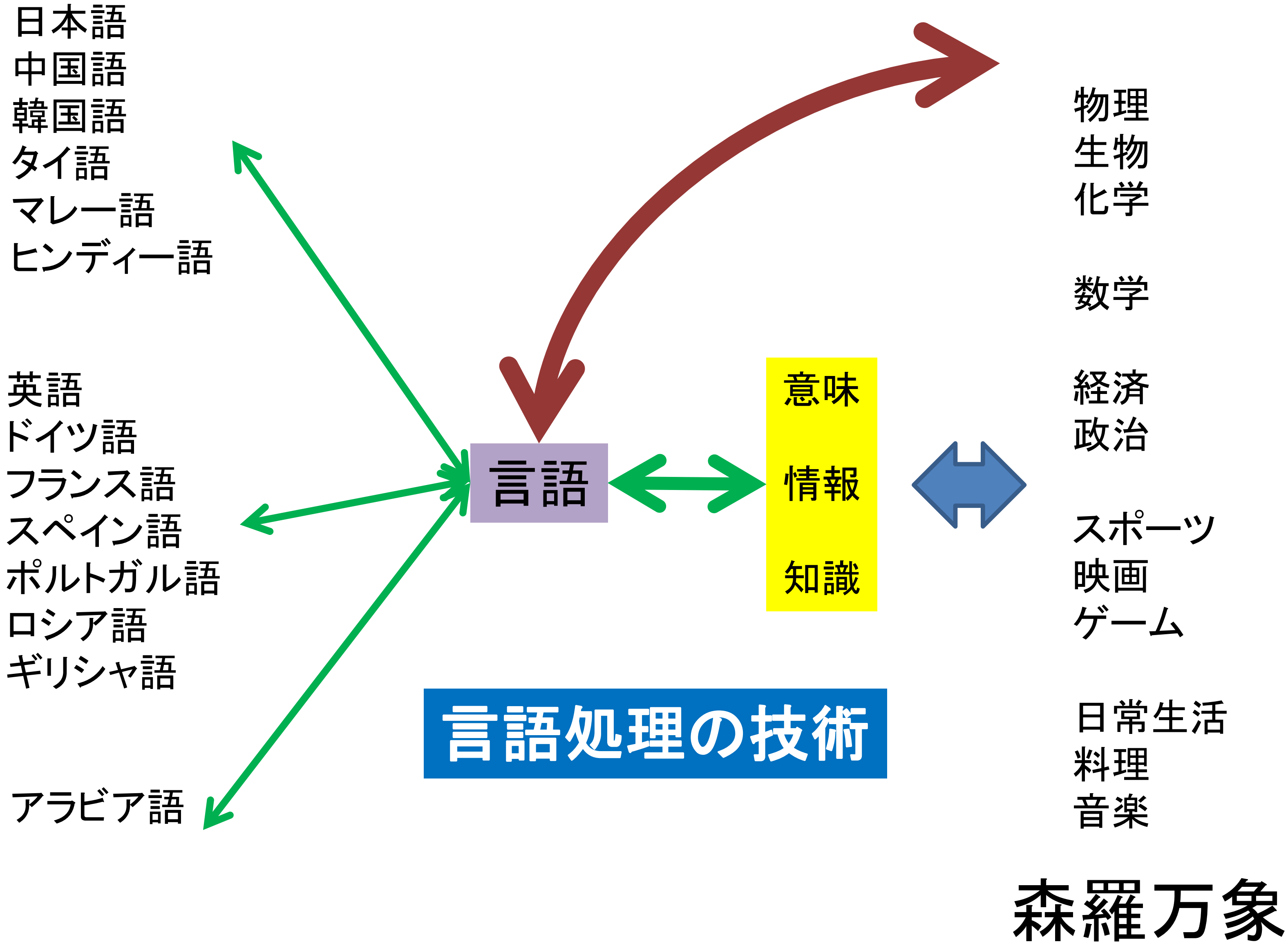
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次回：言語処理の技術、課題