Clínica Universidad de Navarra

# Farmacéutico de Hospital y Farmacogenética-Farmacogenómica

55 Congreso de Farmacia Hospitalaria
Madrid, Octubre de 2010

Azucena Aldaz Pastor
Unidad de Farmacocinética

PK.gen

MADRiD+R
Innovación + Resultados

*SEFH*
*Madrid Octubre 2010*

## Guión

Conceptos introductorios

Encuesta: Objetivo, Realización, Resultados

Ámbito legal de trabajo del farmacéutico de hospital

Situación actual de la farmacogenética asistencial: soporte profesional de las agencias reguladoras

Posicionamiento profesional

Desarrollo de herramientas de ayuda

EMEA/CHMP/ICH/437986/2006

**Topic E15**

Conceptos introductorios:

Definiciones ICH

Farmacogenética/Farmacogenómica: *definiciones de consenso adoptadas por las agencias reguladoras internacionales (2007) a propuesta de la Conferencia internacional en armonización de requerimientos técnicos para el registro de fármacos de uso humano (ICH)*

Biomarcador genómico: Un característica medible de ADN o ARN que es un indicador de un proceso biológico normal, o de un proceso patológico y/o de la respuesta a una intervención terapéutica o de otro tipo.

Farmacogenética: Estudia la influencia de las variaciones genéticas en el ADN sobre la respuesta a los fármacos

Farmacogenómica: Estudia la influencia de las variaciones genéticas en el ADN y el ARN sobre la respuesta al tratamiento farmacológico

Conceptos introductorios:

## Condicionantes de la respuesta

Factores genéticos

Función renal y/o hepática

Adherencia

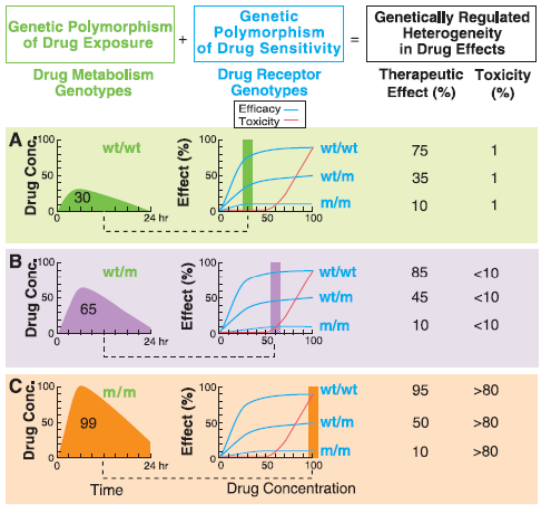
Dieta y otros f. ambientales

Interacciones

Patologías

Sexo

Edad




. *Metabolismo*

. *Receptor*

. *Transporte*

Respuesta a un fármaco

Evans W and Relling M. Science 1999; 286:(487-491)

Conceptos introductorios:

Condicionantes de la respuesta

# The Convergence of Therapeutic Drug Monitoring and Pharmacogenetic Testing to Optimize Efavirenz Therapy

*Salvador Cabrera Figueroa, PhD,*† María Fernández de Gatta, PhD,‡*
*Lorena Hernández García, PhD,§ Alfonso Domínguez-Gil Hurlé, PhD,*‡ Carmen Bustos Bernal, RN,‖*
*Rosa Sepúlveda Correa, PhD,¶ and María José García Sánchez, PhD‡*

(*Ther Drug Monit* 2010;32:579–585)

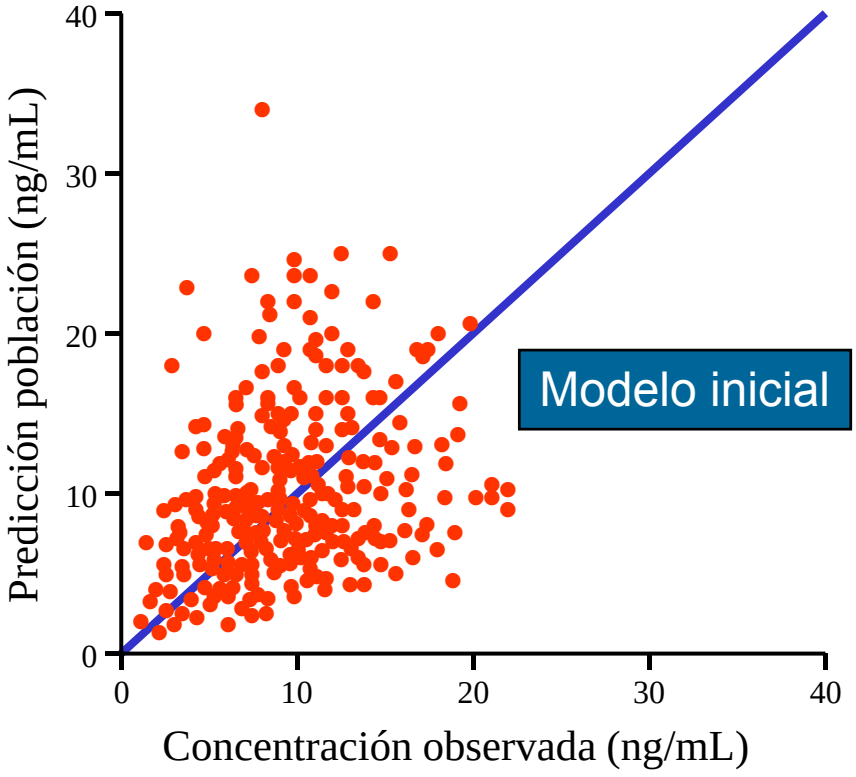
the clinical use of pharmacogenetic testing to guide drug dosage is hampered by two main factors: the effect of nongenetic factors and the limitations related to the inability to predict a reliable safe dosage from pharmacogenetic data. TDM could be used to overcome these limitations and its use as a clinical tool to tailor drug doses has been clearly demonstrated. Recently, the combined use of TDM with pharmacogenetic testing has been advocated to achieve more precise individualized therapy.[21,22]

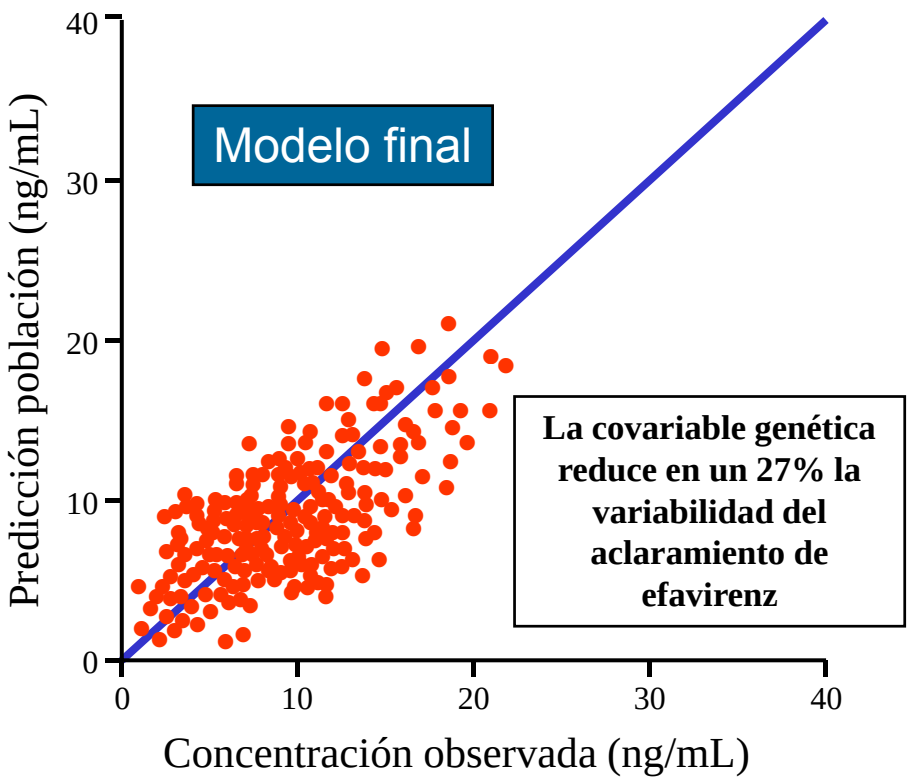
Conceptos introductorios:

Condicionantes de la respuesta

# Farmacocinética poblacional de efavirenz

[a] Final model: $CL/F = \theta_1 \times e^{-\theta 3 \times CYP2B6}$ and $V/F = \theta_2$.




**Cabrera S y cols. Antimicrob Agents Chemother, 2009**

Conceptos introductorios:

Condicionantes de la respuesta

**Therapeutic drug monitoring for triazoles**

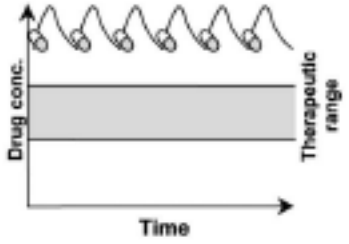
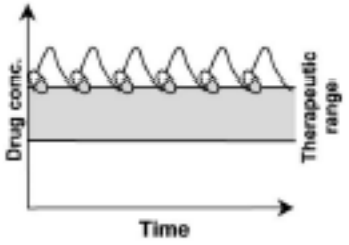
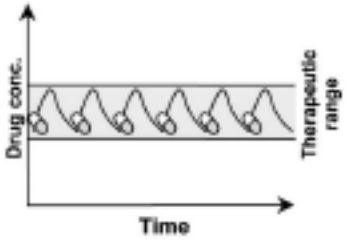
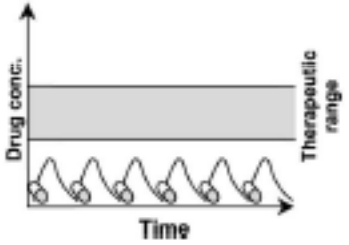
William W. Hope[a], Eliane M. Billaud[b], Jodie Lestner[a] and David W. Denning[a]

**Current Opinion in Infectious Diseases** 2008, 21:580–586

reduced, but measurable enzyme activity. The proportion of poor metabolizers within a population depends on the racial composition; the incidence is 3–5% in whites but as high as 15–20% in Asian patients [46]. Because the CYP2C19 genotype only explains a portion of overall variance, dosing cannot be individualized on the basis of pharmacogenetic data alone.

# Conceptos introductorios:

## Condicionantes de la respuesta

| CYP2D6 function | Mutation | Effect on steady state concentration | Anticipated clinical effect | Possible consequences |
|---|---|---|---|---|
| Poor Metabolizer (PM)<br>No function<br>6 - 8% in Caucasians<br>Gene dose = 0 | Homo- or combined heterozygous with defective enzymes or complete deletions (>15 mutations ) |  | • Toxicity<br>• Adverse drug effects | • Reduce dose<br>• Change medication and avoid substrates of CYP2D6<br>• Ther. drug monitoring |
| Intermediate Metabolizer (IM)<br>Reduced function<br>10 - 33% in Caucasians<br>Gene dose = 0.5 or 1.0 | Combination of dysfunctional and reduced function or normal allele |  | • Adverse drug effects?<br>• Efficient therapy? | • Reduce dose?<br>• Change medication and avoid substrates of CYP2D6?<br>• Ther. drug monitoring? |
| Extensive Metabolizer (EM)<br>Normal function<br>Gene dose = 2.0 or 1.5 | Homozygous wild type or combination of functional and reduced function allele |  | • Desired concentration range<br>• Efficient therapy | |
| **Ultra Rapid Metabolizer (UM)**<br>Enhanced function<br>2 - 4% in Caucasians<br>Gene dose > 2.0 | Duplication or multiplication of functional gene |  | • Ineffective therapy | • Avoid CYP2D6 substrates<br>• Megadose or comedicate CYP2D6 inhibitor and monitor conc. |

(Ther Drug Monit 2010;32:381–386)

*SEFH*
*Madrid Octubre 2010*

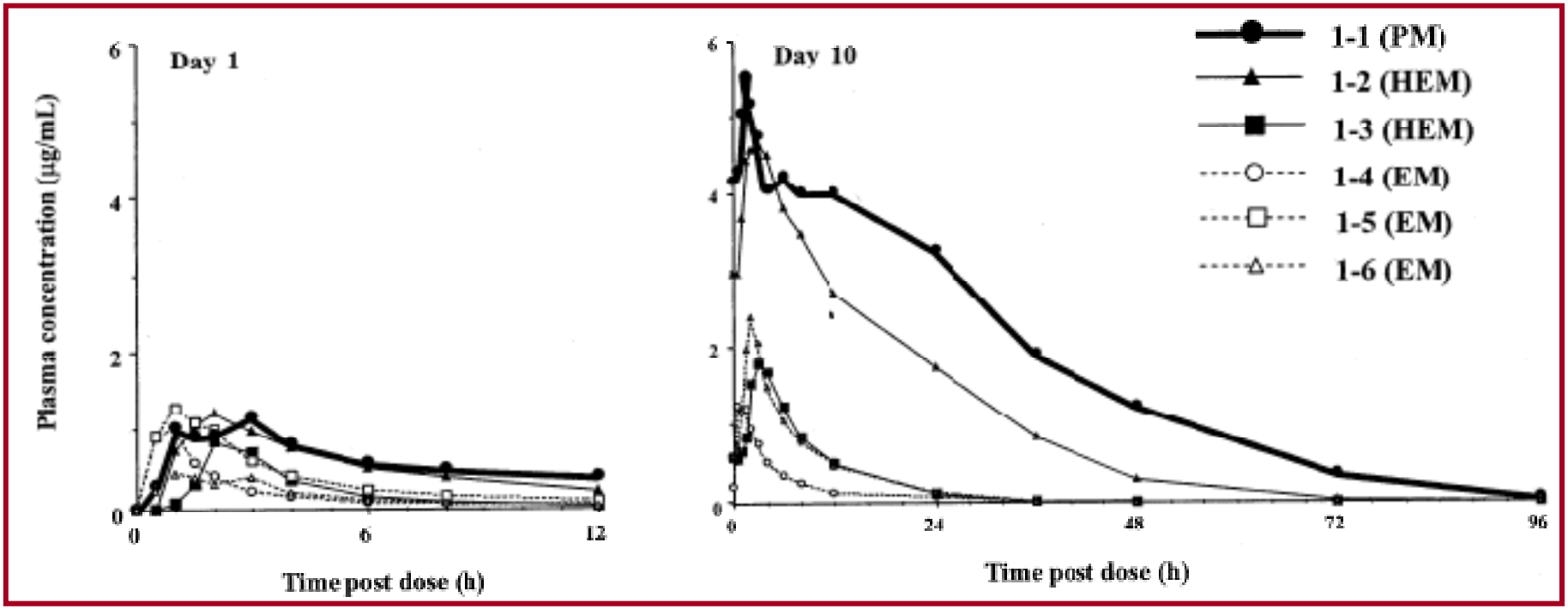
Conceptos introductorios:

Condicionantes de la respuesta

**Pharmacokinetics of voriconazole and cytochrome P450 2C19 genetic status**

CLINICAL PHARMACOLOGY & THERAPEUTICS
2004;75(6):586-8

*Yasuhiko Ikeda, MD*
*Kazuo Umemura, MD*
*Kazunao Kondo, MD*
*Hamamatsu University School of Medicine*
*Hamamatsu, Japan*



# Conceptos introductorios:

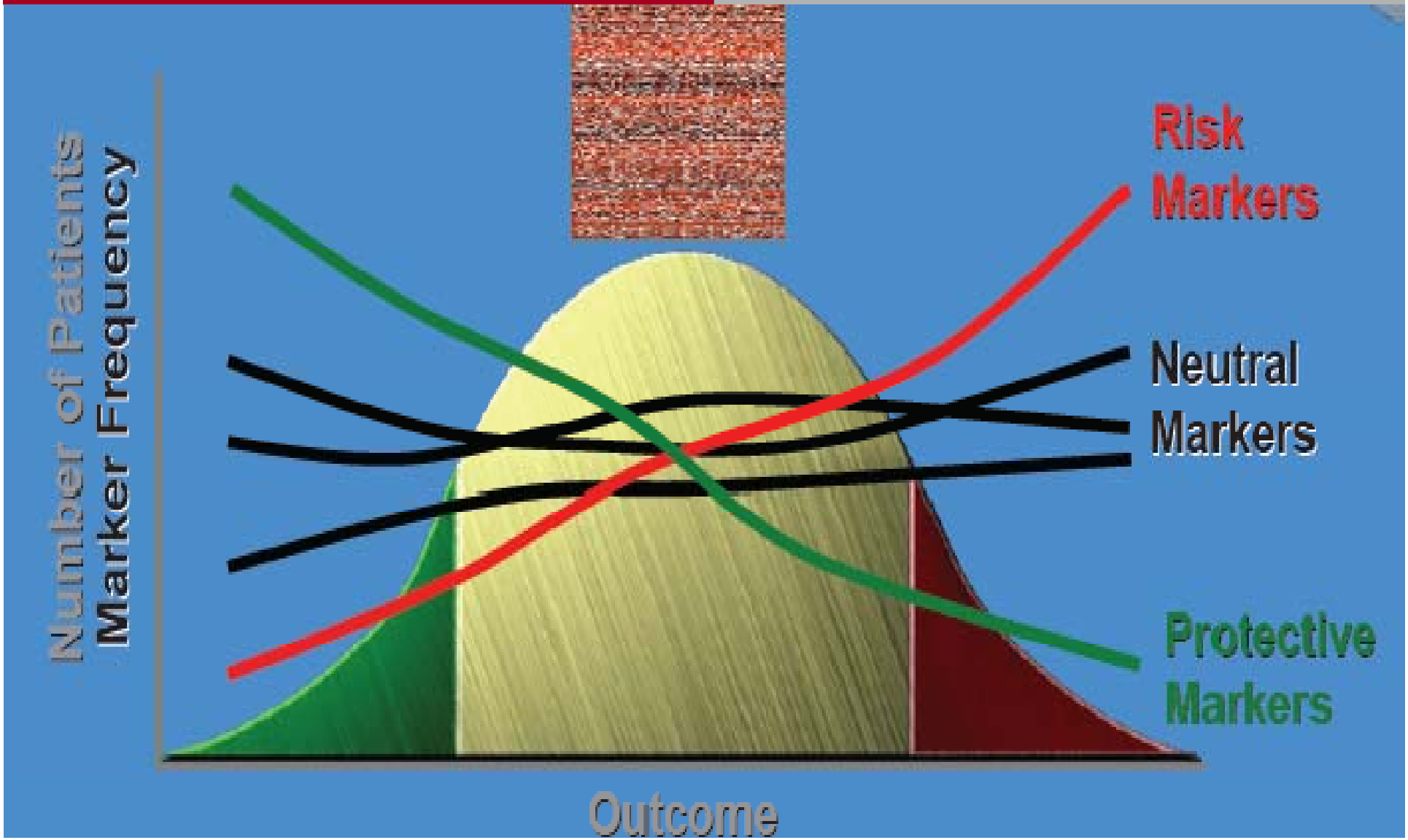
## Condicionantes de la respuesta

| Dosis | Vía | Concentración (mcg/ mL) | Cl (L/ h) | Interacción | Recomendación |
|---|---|---|---|---|---|
| 200 mg c/ 12 h | OR | 14 | 1,19 | **Sorafenib** | Reducir dosis 50 % |
| 50 mg c/ 12 h | OR | 0,53 | 7,86 | **Clindamicina** | Aumentar dosis 75 – 85 % |
| 150 mg c/ 12 h | OR | 2,3 | 5,4 | **¿Mirtazapina o fluoxetina?** | Vigilar posible interacción. No descrita. |
| 200 mg c/ 12 h | OR | 1,15 | 14,5 | **Cassenglicol ®** | Espaciar administración 2 h. Aumentar dosis 50 % |
| 200 mg c/ 12 h | OR | 6,3 | 2,64 | **Fluconazol** (en tratamiento previamente a comenzar con voriconazol) | Disminución del aclaramiento (eliminación saturada). Reducir dosis 25 %. |
| 300 mg c/ 12 h | OR | 1,8 (LCR); 5,4 (estimado en suero) | 4,63 | **Isoniacida** | Reducir dosis 10-25 %. |
| 200 mg c/ 12 h | OR | 0,82 | 20,3 | **Nutrición parenteral** | Administrar por otra vía (periférica). |
| 200 mg c/ 12 h | OR | 5,1 | 3,27 | **Amiodarona** | Reducir 25-30 %. |
| 300 mg c/ 12 h | OR | 9,2 | 2,72 | **Claritromicina** | Disminuir dosis 50 %. |
| 320 mg c/ 12 h | IV | 0,39 | 68,4 | **Rifampicina** | Reduce niveles 90-95 %. Administrar 2 dosis de 600 mg y continuar 300 mg c/ 12 h) |
| 100 mg c/ 12 h | OR | 6,0 | 1,39 | **Pectomon ®** (plantas medicinales) | Disminución del Cl 70%. Suspender Pectomon ® |
| 200 mg c/ 12 h | OR | 1,5 | 11,11 | **¿Metilprednisolona?** | Posible disminución de la absorción o interacción con metilprednisolona. No cuantificada. |
| 400 mg c/ 12 h | IV | 3,5 | 9,5 | **Clindamicina** | Se recomienda paso a vía oral, 200 mg c/ 12 h |
| 275 mg c/ 12 h | IV | 13,3 | 1,72 | **Eritromicina** | Suspender eritromicina |
| N=21 | | | 4,62 ± 2,12 | | |
| N=18 | | | 3,83±0,98 | | |
| N=3 | | ND | | | |

*SEFH*
*Madrid Octubre 2010*

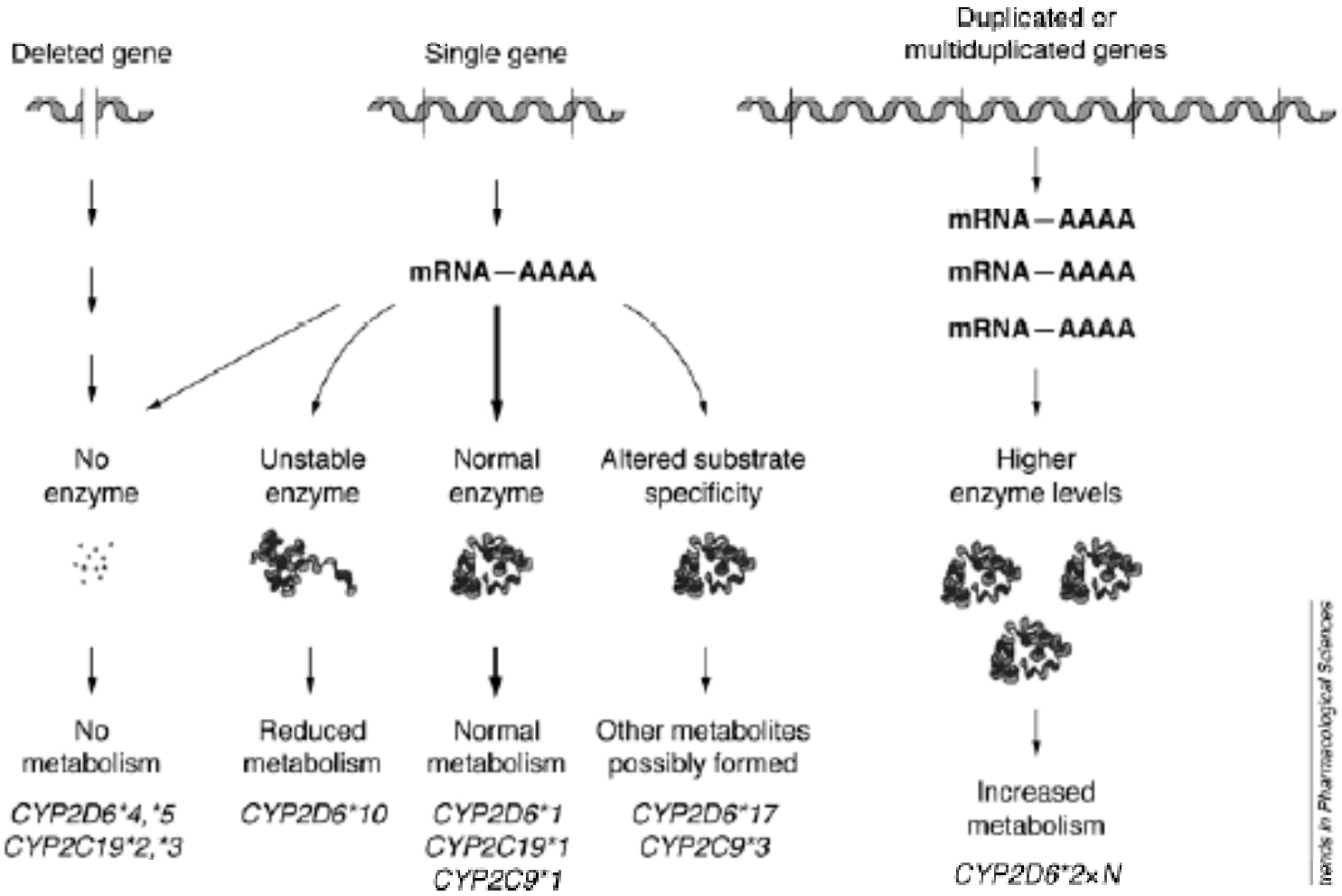
Conceptos introductorios:

Condicionantes de la respuesta



# Conceptos introductorios:

## Condicionantes de la respuesta



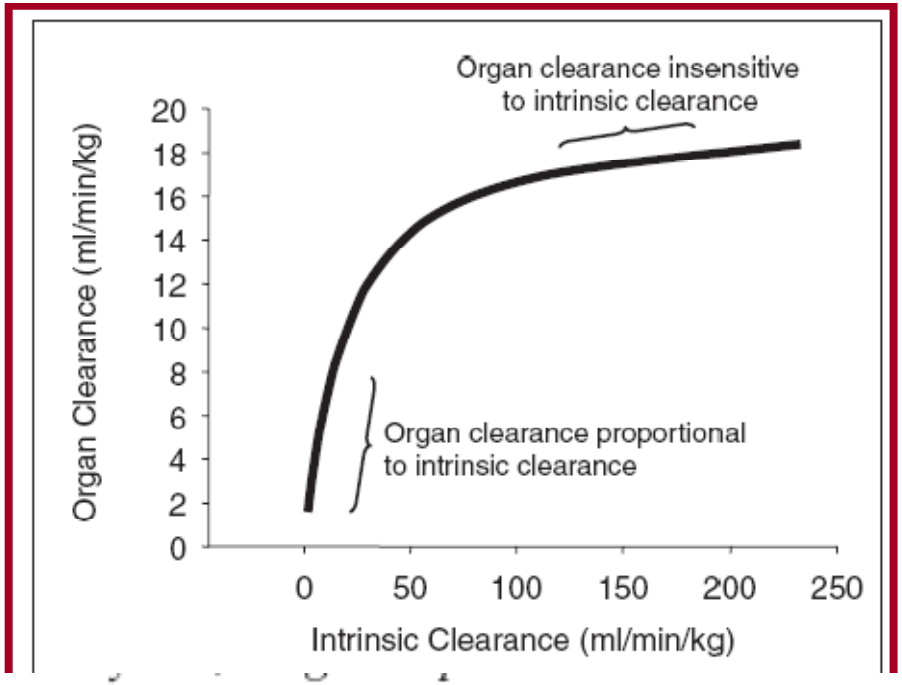
*SEFH*
*Madrid Octubre 2010*

Conceptos introductorios:

Condicionantes de la respuesta

# So Many Studies, Too Few Subjects: Establishing Functional Relevance of Genetic Polymorphisms on Pharmacokinetics

*J. Andrew Williams, PhD, Keith Johnson, PhD, Joseph Paulauskis, PhD, and Jack Cook, PhD*




*Journal of Clinical Pharmacology, 2006;46:258-264*

# Encuesta a farmacéuticos de hospital sobre la actividad en farmacogenética

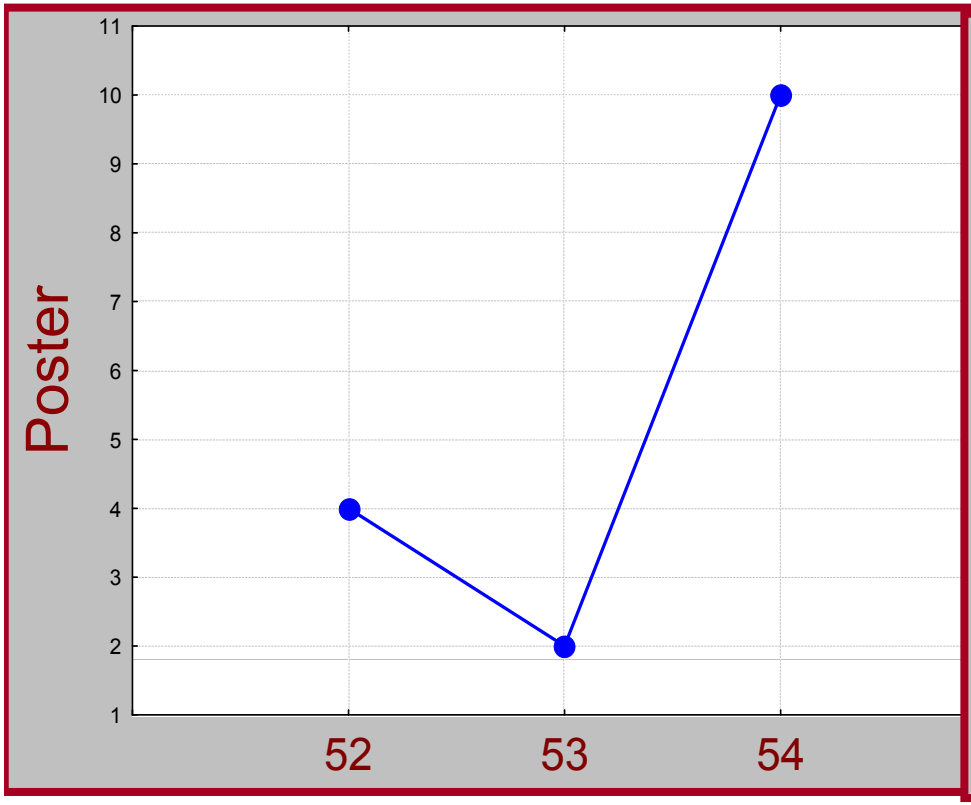
| | | | | | |
|---|---|---|---|---|---|
| Dávila Fajardo, Cristina Lucía | Hospital Universitario San Cecilio | Granada | Andalucía | PG | Investigación |
| Galloso Rey, Mónica | Complexo Hospitalario Universitario de Vigo | Vigo | Galicia | PG | Investigación |
| Isla, Beatriz | Reina Sofía | Córdoba | Andalucía | PG | Investigación |
| Lacruz Guzmán, Diana | Santa María del Rosell | Cartagena | Murcía | PG | Investigación |
| Lamas Diaz, Maria Jesús | CHUSantiago de Compostela | Santiago | Galicia | PG | Rutina |
| MªPaz Valverde | H General Universitario Salamanca | Salamanca | CyL | PG | Rutina |
| Martin Barbero, Marisa | H General Universitario Gregorio Marañón | Madrid | Madrid | PG | Rutina |
| Milara, Javier | H General Universitario de Valencia | Valencia | CV | PG | Rutina |
| Morales Lara, Maria José | HGU Reina Sofía | Murcia | Murcia | PG | Investigación |
| Piñeiro Conde S/Outeda María | CHU Juan Canalejo | A Coruña | Galicia | PG | Rutina |
| Porta Begoña | H Dr. Peset | Valencia | CV | PG | Investigación |

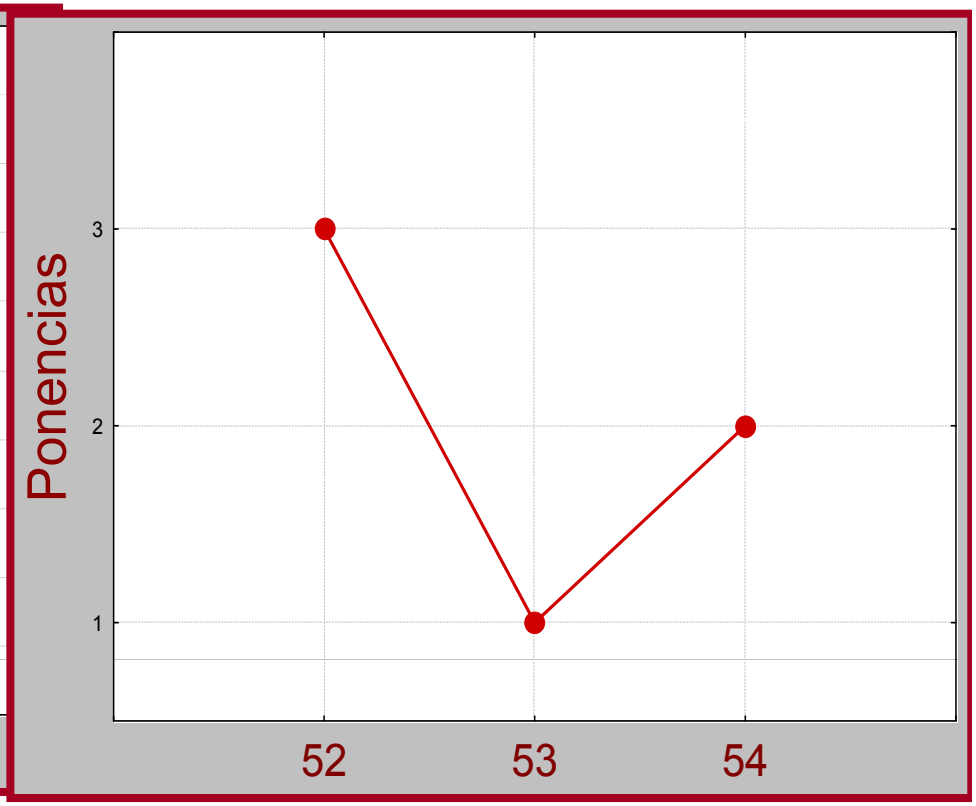
n= 11

*SEFH*
*Madrid Octubre 2010*

Actividad documentada en el Congreso anual de la SEFH

# Ponencias y Posters sobre Farmacogenética-Farmacogenómica en los Congresos anuales de la SEFH (2007-2009)



# Farmacéutico de Hospital: Funciones

LEY 29/2006, de 26 de julio, de garantías y uso racional de los medicamentos y productos sanitarios (BOE 178, de 27 de julio de 2006)

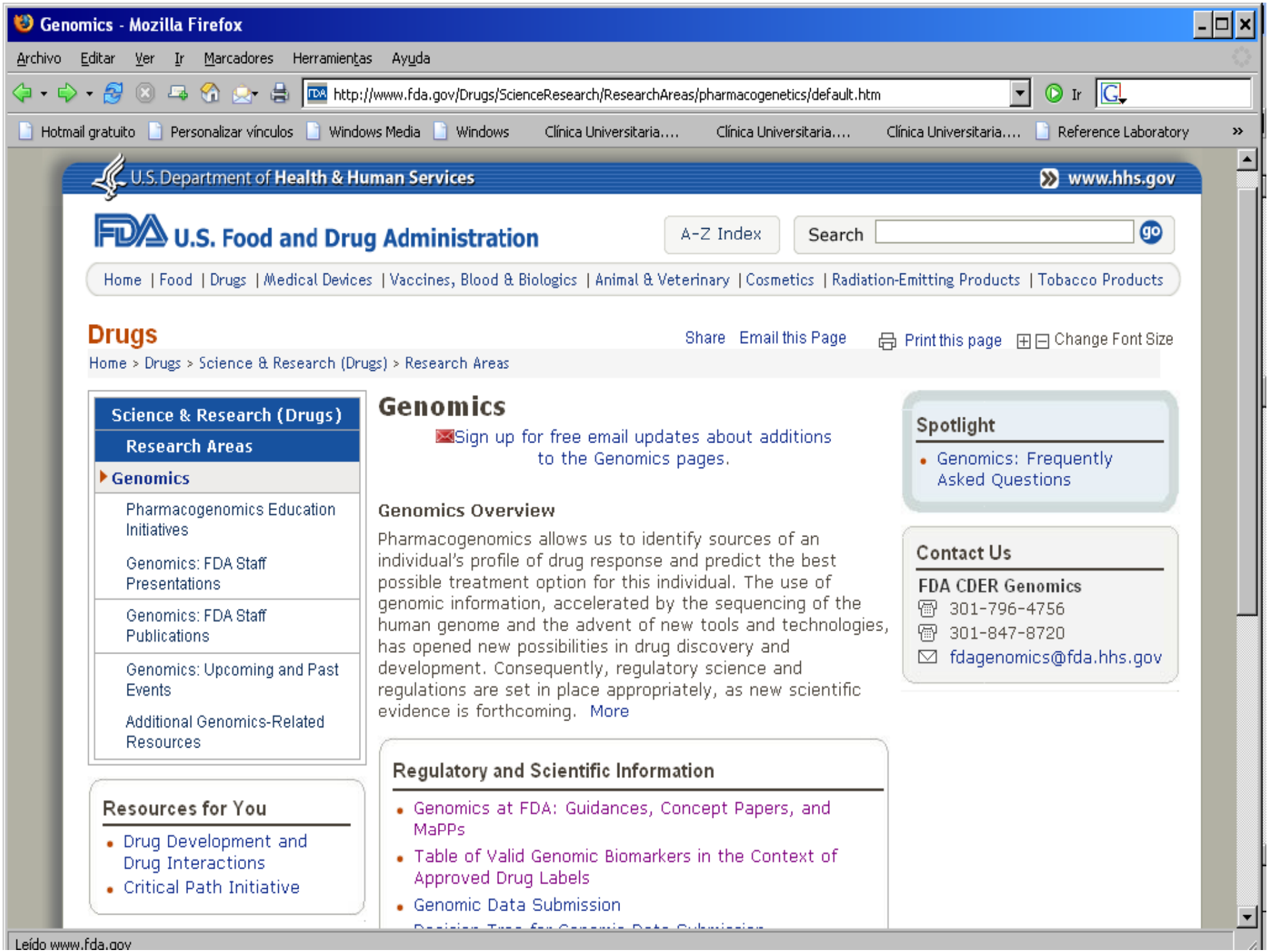
2. Para contribuir al uso racional de los medicamentos las unidades o servicios de farmacia hospitalaria realizarán las siguientes funciones:

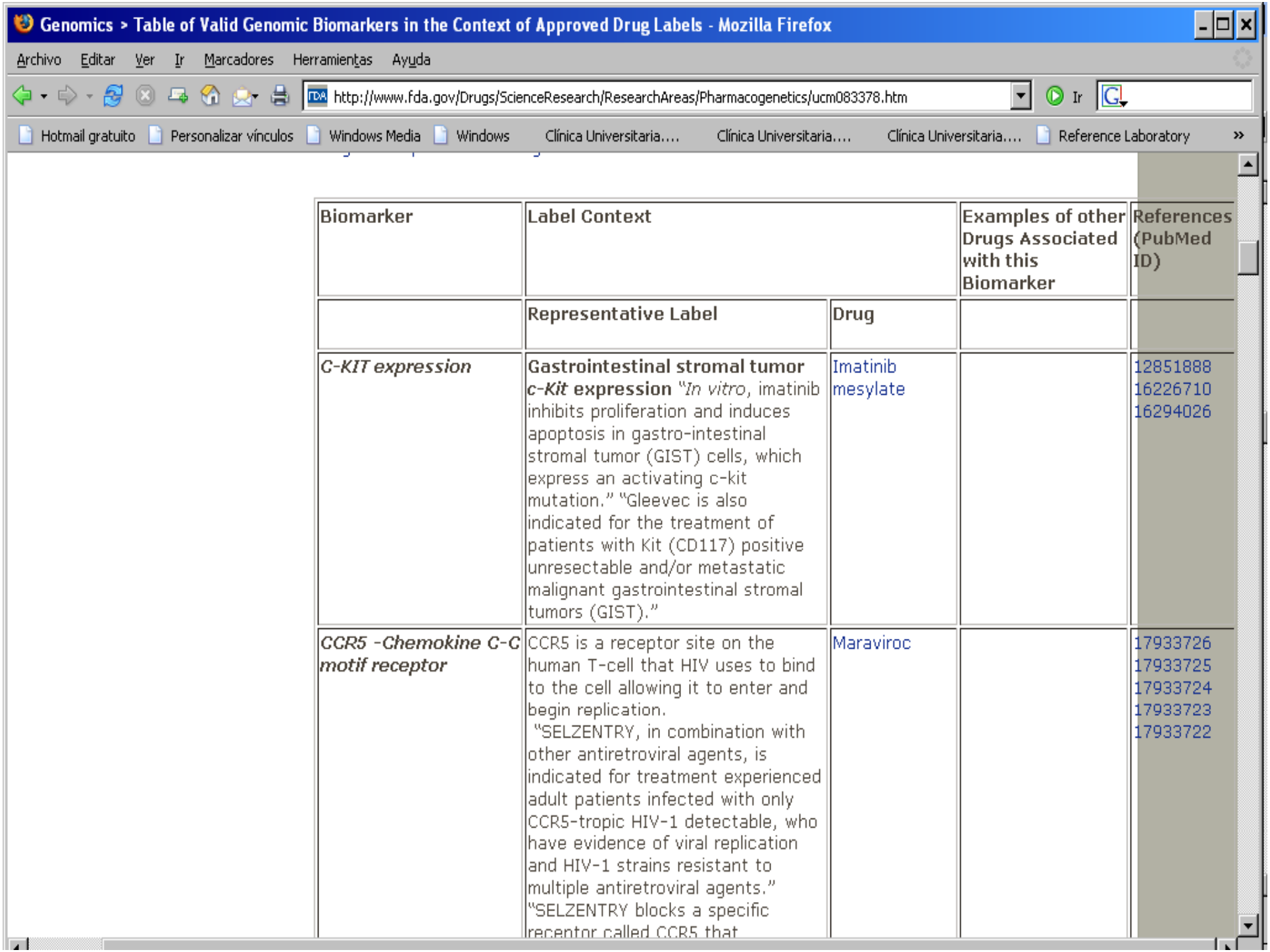
a) Garantizar y asumir la responsabilidad técnica de la adquisición, calidad, correcta conservación, cobertura de las necesidades, custodia, preparación de fórmulas magistrales o preparados oficinales y dispensación de los medicamentos precisos para las actividades intrahospitalarias y de aquellos otros, para tratamientos extrahospitalarios, que requieran una particular vigilancia, supervisión y control.

b) Establecer un sistema eficaz y seguro de distribución de medicamentos, tomar las medidas para garantizar su correcta administración, custodiar y dispensar los productos en fase de investigación clínica y velar por el cumplimiento de la legislación sobre medicamentos de sustancias psicoactivas o de cualquier otro medicamento que requiera un control especial.

c) Formar parte de las comisiones hospitalarias en que puedan ser útiles sus conocimientos para la selección y evaluación científica de los medicamentos y de su empleo.

d) Establecer un servicio de información de medicamentos para todo el personal del hospital, un sistema de farmacovigilancia intrahospitalario, estudios sistemáticos de utilización de medicamentos y actividades de farmacocinética clínica.


Genomics - Mozilla Firefox
Archivo Editar Ver Ir Marcadores Herramientas Ayuda
http://www.fda.gov/Drugs/ScienceResearch/ResearchAreas/pharmacogenetics/default.htm
Ir
Hotmail gratuito
Personalizar vínculos
Windows Media
Windows
Clínica Universitaria....
Clínica Universitaria....
Clínica Universitaria....
Reference Laboratory
U.S. Department of Health & Human Services
www.hhs.gov
U.S. Food and Drug Administration
A-Z Index
Search
go
Home | Food | Drugs | Medical Devices | Vaccines, Blood & Biologics | Animal & Veterinary | Cosmetics | Radiation-Emitting Products | Tobacco Products
Drugs
Share
Email this Page
Print this page
Change Font Size
Home > Drugs > Science & Research (Drugs) > Research Areas
Science & Research (Drugs)
Research Areas
Genomics
Pharmacogenomics Education Initiatives
Genomics: FDA Staff Presentations
Genomics: FDA Staff Publications
Genomics: Upcoming and Past Events
Additional Genomics-Related Resources
Resources for You
Drug Development and Drug Interactions
Critical Path Initiative
Genomics
Sign up for free email updates about additions to the Genomics pages.
Genomics Overview
Pharmacogenomics allows us to identify sources of an individual's profile of drug response and predict the best possible treatment option for this individual. The use of genomic information, accelerated by the sequencing of the human genome and the advent of new tools and technologies, has opened new possibilities in drug discovery and development. Consequently, regulatory science and regulations are set in place appropriately, as new scientific evidence is forthcoming. More
Regulatory and Scientific Information
Genomics at FDA: Guidances, Concept Papers, and MaPPs
Table of Valid Genomic Biomarkers in the Context of Approved Drug Labels
Genomic Data Submission
Spotlight
Genomics: Frequently Asked Questions
Contact Us
FDA CDER Genomics
301-796-4756
301-847-8720
fdagenomics@fda.hhs.gov
Leído www.fda.gov




| Biomarker | Label Context | | Examples of other Drugs Associated with this Biomarker | References (PubMed ID) |
|---|---|---|---|---|
| | Representative Label | Drug | | |
| *C-KIT expression* | **Gastrointestinal stromal tumor *c-Kit* expression** "*In vitro*, imatinib inhibits proliferation and induces apoptosis in gastro-intestinal stromal tumor (GIST) cells, which express an activating c-kit mutation." "Gleevec is also indicated for the treatment of patients with Kit (CD117) positive unresectable and/or metastatic malignant gastrointestinal stromal tumors (GIST)." | Imatinib mesylate | | 12851888<br>16226710<br>16294026 |
| *CCR5 -Chemokine C-C motif receptor* | CCR5 is a receptor site on the human T-cell that HIV uses to bind to the cell allowing it to enter and begin replication.<br>"SELZENTRY, in combination with other antiretroviral agents, is indicated for treatment experienced adult patients infected with only CCR5-tropic HIV-1 detectable, who have evidence of viral replication and HIV-1 strains resistant to multiple antiretroviral agents." "SELZENTRY blocks a specific receptor called CCR5 that | Maraviroc | | 17933726<br>17933725<br>17933724<br>17933723<br>17933722 |

# Soporte de las agencias reguladoras

| Biomarker | Label | Indication | Drug |
|---|---|---|---|
| CCR5-chemokine C-C motif receptor | Maraviroc in combination with other anti-retroviral agents is indicated for treatment-experienced adult patients infected with only CCR5-tropic HIV-1 | HIV | Maraviroc |
| Epidermal growth factor receptor (EGFR) expression | Patients enrolled in clinical studies were required to have immune-histochemical evidence of EGFR expression using the DaktoCytomation EGFR pharmDx test | Colorectal cancer | Cetuximab |
| Her2/neu over-expression | Detection of Her2 over-expression is necessary for selection of patients appropriate for Herceptin therapy | Breast Cancer | Trastuzumab (Herceptin) |
| Philadelphia chromosome-positive responders | Dasatinib is effective for the treatment of adults with Philadelphia chromosome-positive acute lymphoblastic leukaemia (Ph+ALL) with resistance or intolerance to prior therapy | Leukaemia | Dasatinib |

impact on the tumoral potential. Thus, many actors interfere with EGFR, minimising its proper impact. In line with this, there is no apparent correlation between the expression of EGFR and response to certain targeted drugs, such as cetuximab, in metastatic colorectal cancer [5]. Tyrosine kinase inhibitors might interfere with the phosphorylation of several of these pathways such as Ras/ Raf/mitogen-activated protein kinase, or phosphatidylinositol 3′-kinase-Akt.
Thus, eventual prognostic impact of EGFR might be reversed by targeted drugs such as illustrated in patients with metastatic breast cancer overexpressing HER2 and treated by trastuzumab.

For all these reasons, the crude expression of EGFR probably does not belong to the most crucial biomarkers such as those selecting candidates to adjuvant systemic therapy among stage II patients, or predicting response to a given drug.

C. Alliot. 2005 European Society for medical oncology

Soporte de las agencias reguladoras

## Prospecto de voriconazol aprobado FDA

"*In vivo* studies indicated that CYP2C19 is significantly involved in the metabolism of voriconazole. This enzyme exhibits genetic polymorphism. For example, 15-20% of Asian populations may be expected to be poor metabolizers. For Caucasians and Blacks, the prevalence of poor metabolizers is 3-5%.

**8.9 Metabolic Status** In healthy subjects, patients with stable atherosclerosis, and patients with ACS receiving prasugrel, there was no relevant effect of genetic variation in CYP2B6, CYP2C9, CYP2C19, or CYP3A5 on the pharmacokinetics of prasugrel's active metabolite or its inhibition of platelet aggregation. (8. Use in Special Populations)

There is no relevant effect of genetic variation in CYP2B6, CYP2C9, CYP2C19, or CYP3A5 on the pharmacokinetics of 352 prasugrel's active metabolite or its inhibition of platelet aggregation. (12 Clinical Pharmacology- 12.5 Pharmacogenomics)

Whereas the pharmacokinetics of prasugrel's active metabolite are not known to be affected by genetic variations in CYP2B6, CYP2C9, CYP2C19, or CYP3A5, the pharmacokinetics of clopidogrel's active metabolite are affected by CYP2C19 genotype, and approximately 30% of Caucasians are reduced-metabolizers (14 Clinical Studies).

# Blue Cross and Blue Shield Association (2008)

"insufficient evidence to permit conclusions regarding the use of CYP2D6 genotyping for directing endocrine therapy regimen selection for women at high risk for or with breast cancer"

http://www.bcbs.com/blueresources/tec/vols/23/cyp2d6-pharmacogenomics-of.html

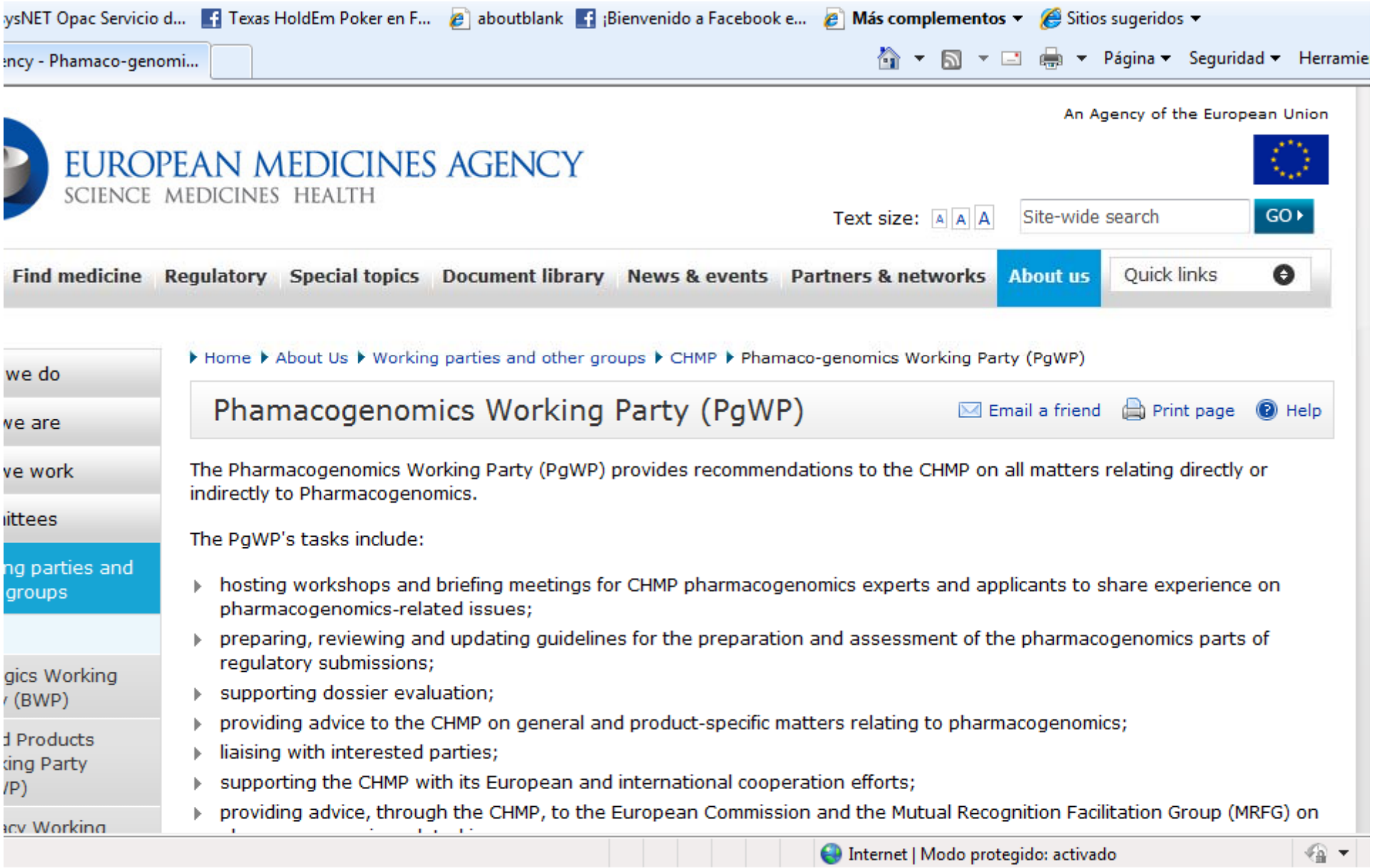
## Soporte de las agencias reguladoras

*Evidence Report/Technology Assessment*
**Number 146**

# Testing for Cytochrome P450 Polymorphisms in Adults With Non-Psychotic Depression Treated With Selective Serotonin Reuptake Inhibitors (SSRIs)

**Conclusions:** There is a paucity of good-quality data addressing the questions of whether testing for CYP450 polymorphisms in adults entering SSRI treatment for non-psychotic depression leads to improvement in outcomes, or whether testing results are useful in medical, personal, or public health decisionmaking.

http://www.ahrq.gov/downloads/pub/evidence/pdf/cyp450/cyp450.pdf


ysNET Opac Servicio d...
Texas HoldEm Poker en F...
aboutblank
¡Bienvenido a Facebook e...
Más complementos
Sitios sugeridos
ncy - Phamaco-genomi...
Página
Seguridad
Herramie
An Agency of the European Union
EUROPEAN MEDICINES AGENCY
SCIENCE MEDICINES HEALTH
Text size: A A A
Site-wide search
GO
Find medicine
Regulatory
Special topics
Document library
News & events
Partners & networks
About us
Quick links
we do
we are
we work
ittees
ng parties and groups
gics Working (BWP)
d Products king Party /P)
acy Working
Home
About Us
Working parties and other groups
CHMP
Phamaco-genomics Working Party (PgWP)
Phamacogenomics Working Party (PgWP)
Email a friend
Print page
Help
The Pharmacogenomics Working Party (PgWP) provides recommendations to the CHMP on all matters relating directly or indirectly to Pharmacogenomics.
The PgWP's tasks include:
hosting workshops and briefing meetings for CHMP pharmacogenomics experts and applicants to share experience on pharmacogenomics-related issues;
preparing, reviewing and updating guidelines for the preparation and assessment of the pharmacogenomics parts of regulatory submissions;
supporting dossier evaluation;
providing advice to the CHMP on general and product-specific matters relating to pharmacogenomics;
liaising with interested parties;
supporting the CHMP with its European and international cooperation efforts;
providing advice, through the CHMP, to the European Commission and the Mutual Recognition Facilitation Group (MRFG) on
Internet | Modo protegido: activado

EMEA abril 2008 PG y cancer.pdf - Adobe Reader

Archivo Edición Ver Documento Herramientas Ventana Ayuda

1 / 12 124% Buscar

European Medicines Agency

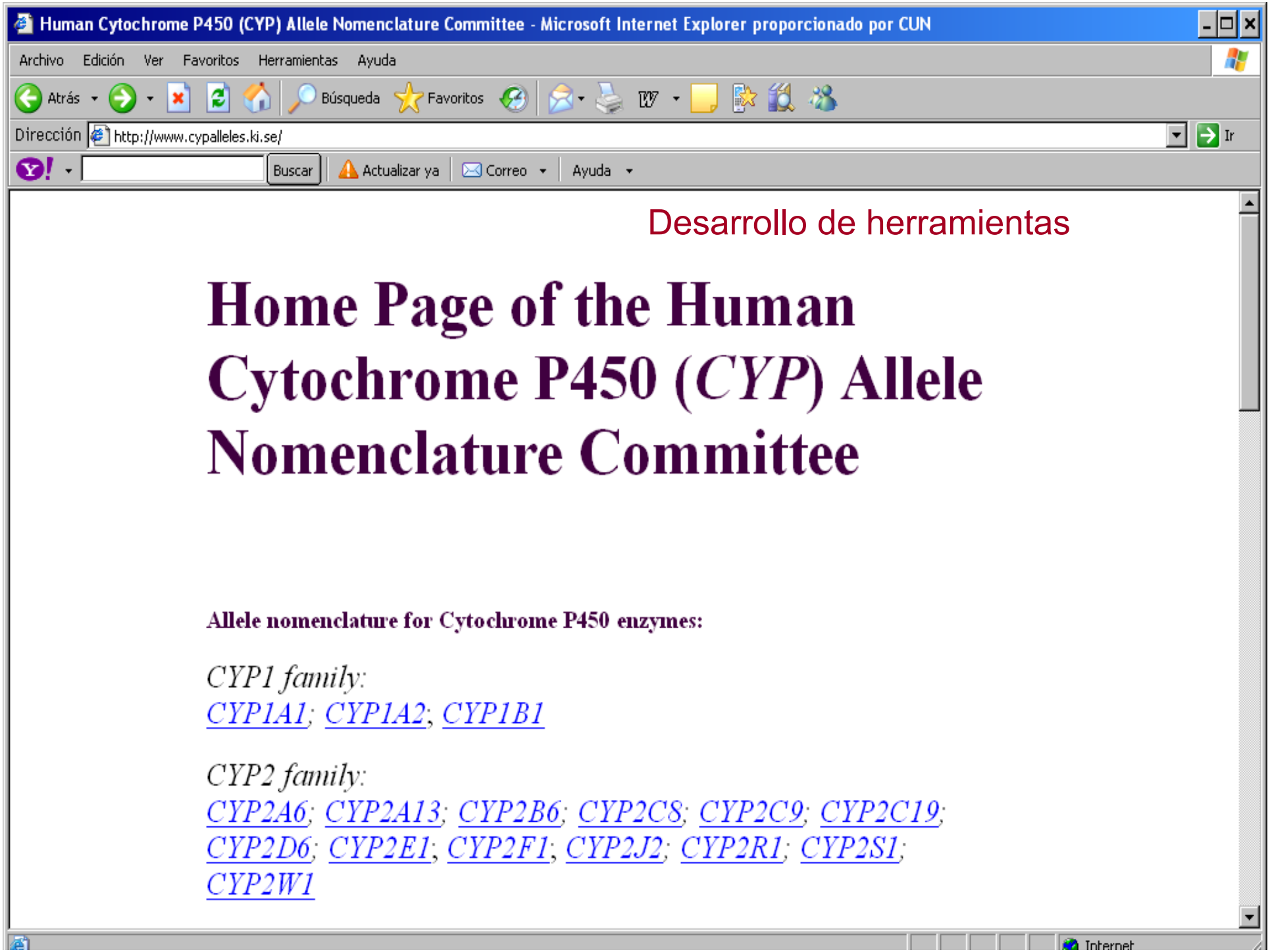
London, April 2008
Doc. Ref. EMEA/CHMP/PGxWP/128435/2006

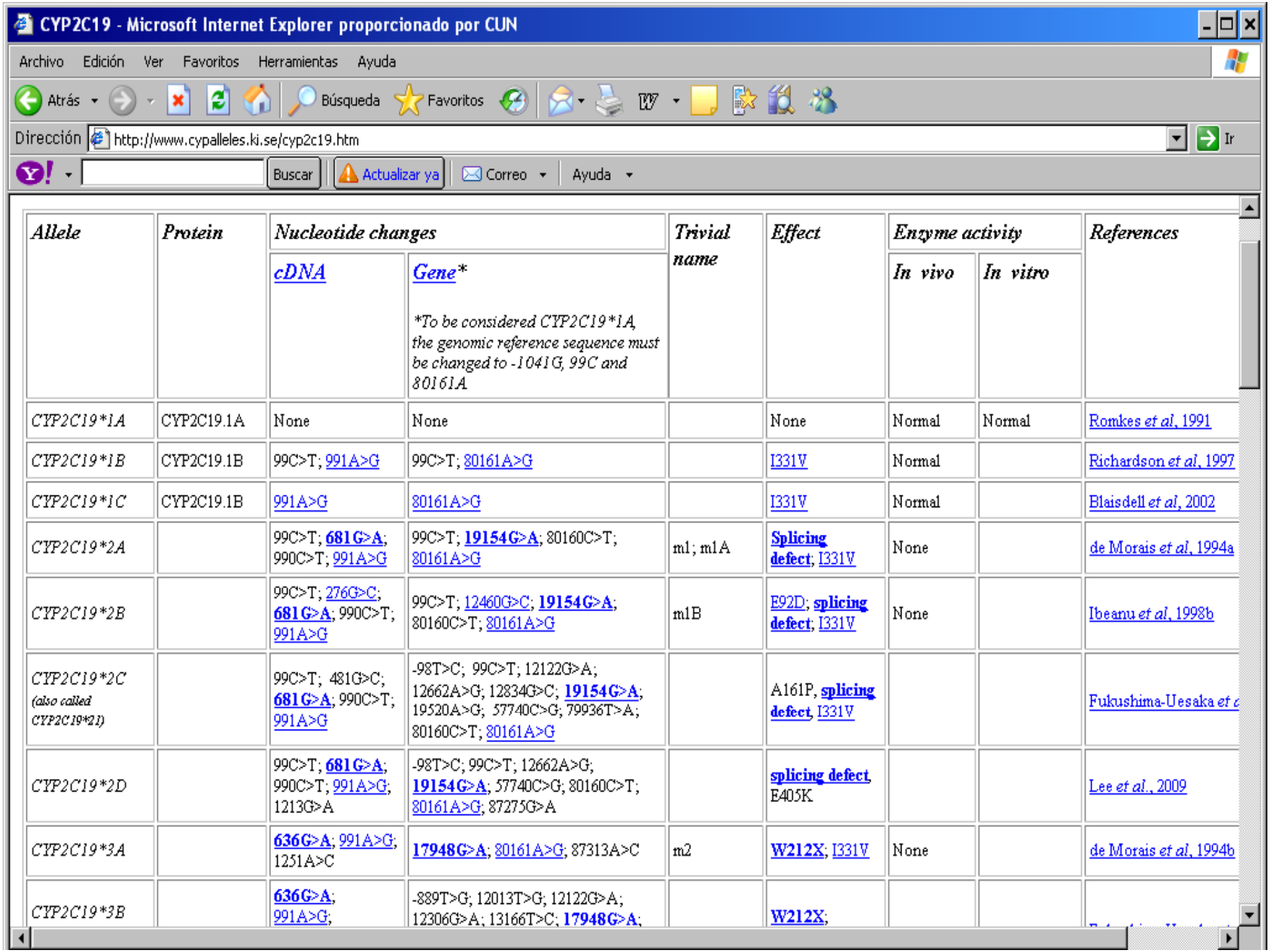
COMMITTEE FOR HUMAN MEDICINAL PRODUCTS

# REFLECTION PAPER ON PHARMACOGENOMICS IN ONCOLOGY

| | |
|---|---|
| DRAFT AGREED BY THE PG WORKING PARTY | April 2008 |
| ADOPTION BY CHMP [FOR RELEASE FOR CONSULTATION] | April 2008 |

Diapositiva 13 de 35 Diseño predeterminado ñol (España - alfab. internacior


Human Cytochrome P450 (CYP) Allele Nomenclature Committee - Microsoft Internet Explorer proporcionado por CUN
Archivo Edición Ver Favoritos Herramientas Ayuda
Atrás Búsqueda Favoritos
Dirección http://www.cypalleles.ki.se/
Ir
Buscar Actualizar ya Correo Ayuda
Desarrollo de herramientas
Home Page of the Human Cytochrome P450 (CYP) Allele Nomenclature Committee
Allele nomenclature for Cytochrome P450 enzymes:
CYP1 family:
CYP1A1; CYP1A2; CYP1B1
CYP2 family:
CYP2A6; CYP2A13; CYP2B6; CYP2C8; CYP2C9; CYP2C19; CYP2D6; CYP2E1; CYP2F1; CYP2J2; CYP2R1; CYP2S1; CYP2W1
Internet




| *Allele* | *Protein* | *Nucleotide changes* | | *Trivial name* | *Effect* | *Enzyme activity* | | *References* |
|---|---|---|---|---|---|---|---|---|
| | | *cDNA* | *Gene** **To be considered CYP2C19*1A, the genomic reference sequence must be changed to -1041G, 99C and 80161A* | | | *In vivo* | *In vitro* | |
| *CYP2C19*1A* | CYP2C19.1A | None | None | | None | Normal | Normal | Romkes *et al*, 1991 |
| *CYP2C19*1B* | CYP2C19.1B | 99C>T; 991A>G | 99C>T; 80161A>G | | I331V | Normal | | Richardson *et al*, 1997 |
| *CYP2C19*1C* | CYP2C19.1B | 991A>G | 80161A>G | | I331V | Normal | | Blaisdell *et al*, 2002 |
| *CYP2C19*2A* | | 99C>T; **681G>A**; 990C>T; 991A>G | 99C>T; **19154G>A**; 80160C>T; 80161A>G | m1; m1A | **Splicing defect**; I331V | None | | de Morais *et al*, 1994a |
| *CYP2C19*2B* | | 99C>T; 276G>C; **681G>A**; 990C>T; 991A>G | 99C>T; 12460G>C; **19154G>A**; 80160C>T; 80161A>G | m1B | E92D; **splicing defect**; I331V | None | | Ibeanu *et al*, 1998b |
| *CYP2C19*2C* *(also called CYP2C19*21)* | | 99C>T; 481G>C; **681G>A**; 990C>T; 991A>G | -98T>C; 99C>T; 12122G>A; 12662A>G; 12834G>C; **19154G>A**; 19520A>G; 57740C>G; 79936T>A; 80160C>T; 80161A>G | | A161P, **splicing defect**, I331V | | | Fukushima-Uesaka *et a* |
| *CYP2C19*2D* | | 99C>T; **681G>A**; 990C>T; 991A>G; 1213G>A | -98T>C; 99C>T; 12662A>G; **19154G>A**; 57740C>G; 80160C>T; 80161A>G; 87275G>A | | **splicing defect**, E405K | | | Lee *et al*., 2009 |
| *CYP2C19*3A* | | **636G>A**; 991A>G; 1251A>C | **17948G>A**; 80161A>G; 87313A>C | m2 | **W212X**; I331V | None | | de Morais *et al*, 1994b |
| *CYP2C19*3B* | | **636G>A**; 991A>G; | -889T>G; 12013T>G; 12122G>A; 12306G>A; 13166T>C; **17948G>A**; | | **W212X**; | | | |

Cytochrome P450 Homepage - Microsoft Internet Explorer proporcionado por CUN

Archivo Edición Ver Favoritos Herramientas Ayuda

Atrás Búsqueda Favoritos

Dirección http://drnelson.uthsc.edu/CytochromeP450.html Ir

Buscar Actualizar ya Correo Ayuda

# Cytochrome P450 Homepage


Click here!

**How to search this website with Google**

Citation for this page: Nelson, DR (2009) The Cytochrome P450 Homepage. Human Genomics 4, 59-65.

| | | | |
|---|---|---|---|
| **What's New** | **Databases** | **Nomenclature** | |
| **P450 Blast server sequences** | **P450 Genomes** | **3D P450 Structure tour uses CHIME** | |
| **Trees** | **Alignments** | **Rogue's Gallery** | |
| **P450 Stats** | **Publications** | **P450 Talks/Lectures** | |
| | human May 17, 2007 | chimp March 19, 2004 | Rhesus monkey Jan. 26, 2006 |
| | mouse May 15, 2007 | rat April 27, 2007 | cattle Revised July 21, 2005 |

David Nelsons Cytochrome P450 Homepage Internet

## Desarrollo de herramientas

PharmGKB www.pharmgkb.org

NLM http://ghr.nlm.nih.gov/

HuGENet™ http://www.cdc.gov/genomics/hugenet/

JAMA Author John Attia (serie 3 artículos 2009)

**How to Use an Article About Genetic Association: A: Background Concepts**

**How to Use an Article About Genetic Association: B: Are the Results of the Study Valid?**

**How to Use an Article About Genetic Association: C: What Are the Results and Will They Help Me in Caring for My Patients?**

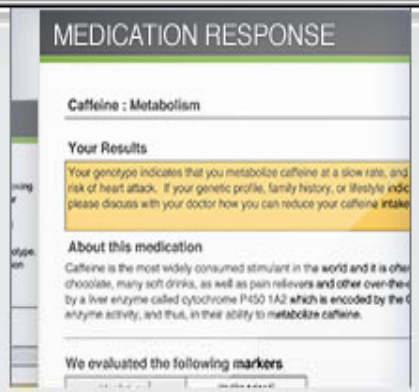

**"Here's my sequence..."**

Archivo Edición Ver Favoritos Herramientas Ayuda

Atrás Búsqueda Favoritos

Dirección http://www.pathway.com/dna-reports Ir

Buscar Actualizar ya Correo Ayuda




## DRUG RESPONSE (MEDICATION)

Identify how your genes may affect your response to drugs such as cancer treatments, cholesterol lowering drugs and more.

### *Drug Response (Medication)*

Reports how effective and safe certain drugs may be for you, including warfarin, Plavix, and statins.

Read more

### *Pre-Pregnancy Planning*

Pre-Pregnancy Planning Screens rare but serious conditions that could be passed on to your children.

Read more

### *Health Conditions*

Identifies your genetic risk for common health conditions such as melanoma, prostate cancer and rheumatoid arthritis.

Read more

Necesidad de posicionamiento

Genetic DNA Report | Drug Response (Medication) Insight | Pathway.com - Microsoft Internet Explorer proporcionado por CUN

Archivo Edición Ver Favoritos Herramientas Ayuda

Atrás Búsqueda Favoritos

Dirección http://www.pathway.com/dna-reports/medication-response Ir

Buscar Actualizar ya Correo Ayuda

PATHWAY GENOMICS™
The Value of Knowing

Have a question? Call us at (877) 505 -7374 or Contact Us

Activate Kit | Log In

Drug Response (Medication) | List of Drugs Tested | Using Your Kit | Science & Security | Preview

HOME ABOUT US DNA REPORTS

# Drug Response (Medication)

Knowing how your genes may affect your response to certain drugs may improve the quality of your life.

## YOUR GENES CAN AFFECT YOUR RESPONSE TO DRUGS

*One of the great promises of genetic testing is personalized medicine — allowing your physician to prescribe the medication that is optimal for you based on your genotype. This kind of information can save you significant time, money and unnecessary suffering. Your genetics can determine how effective a particular drug is for you. In addition, your genetics may place you at risk of side effects for some drugs.*

Learn more about what type of drugs we test for.

Ask Your Doctor

Genetic DNA Report | Drug Response (Medication) Insight | Pathway.com - Microsoft Internet Explorer proporcionado por CUN

Archivo Edición Ver Favoritos Herramientas Ayuda

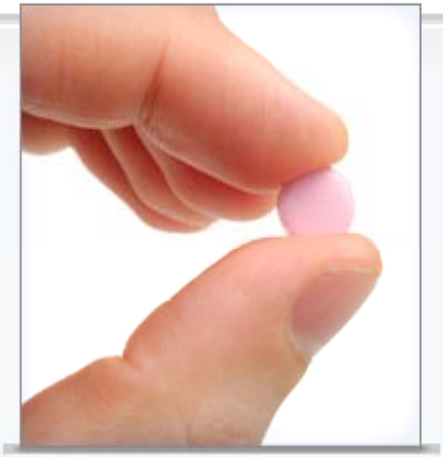
Atrás Búsqueda Favoritos

Dirección http://www.pathway.com/dna-reports/medication-response Ir

Buscar Actualizar ya Correo Ayuda

## EXAMPLE DRUG REPORTS AND HOW YOUR DOCTOR CAN PERSONALIZE YOUR TREATMENT

*Knowing ahead of time how you respond to certain drugs may help your doctor either prescribe the best drug or the best dose of a drug based on your genetic profile.*



## PLAVIX

Clopidogrel (sold under brand names such as Plavix, Clopilet and Ceruvin) is a drug you take orally. It acts to stop the platelets in your blood from sticking together, which would prevent the beginning of a blood clot. It is used to inhibit the formation of blood clots in patients with coronary artery disease, peripheral vascular disease and cerebrovascular disease.

See our full list of Medications tested

Genetic DNA Report | Drug Response (Medication) Insight | Pathway.com - Microsoft Internet Explorer proporcionado por CUN

Archivo Edición Ver Favoritos Herramientas Ayuda

Atrás Búsqueda Favoritos

Dirección http://www.pathway.com/dna-reports/medication-response Ir

Buscar Actualizar ya Correo Ayuda

[See our full list of Medications tested]

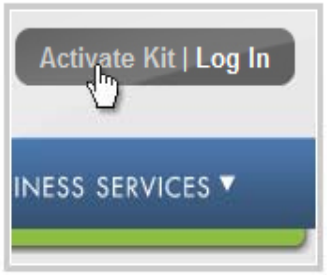
## *How this information can empower you and your doctor*

Your genetics can affect how effectively Plavix is metabolized, and thus how well it will work to protect you against blood clot formation. Based on your results, your physician might consider prescribing a nonstandard dose of Plavix or a different medication altogether. If you are taking Plavix, do not stop taking it or adjust your drug dosage without consulting with your physician.

## USING YOUR KIT

*It's simple and easy to use*

*Step 1. Ask your Doctor*




*Step 2. Activate your kit*

*Step 3. Fill saliva tube*

*Step 4. Send it back*

*Step 5. Get your results*

Genetic DNA Report | Drug Response (Medication) Insight | Pathway.com - Microsoft Internet Explorer proporcionado por CUN

Archivo Edición Ver Favoritos Herramientas Ayuda

Atrás Búsqueda Favoritos

Dirección http://www.pathway.com/dna-reports/medication-response

Ir

Buscar Actualizar ya Correo Ayuda

## PREVIEW OF RESULTS

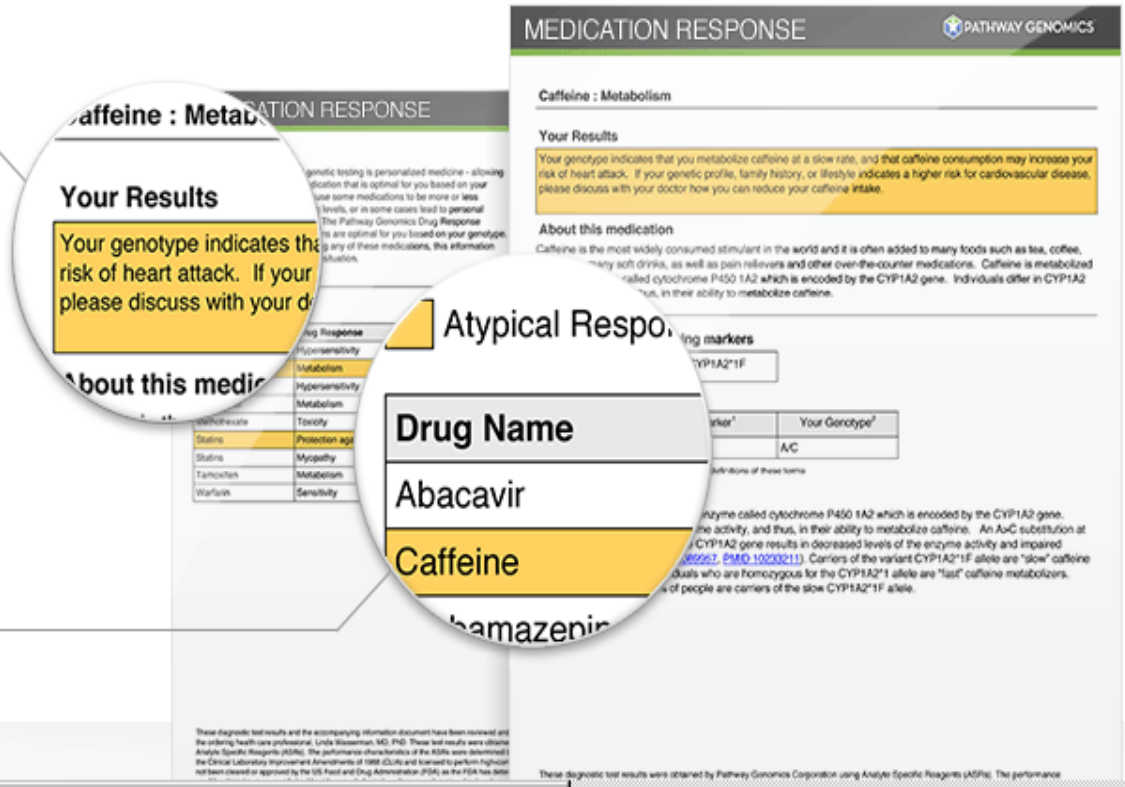
*An easy-to-understand report will be posted to the user's secure member account. From there it can be downloaded, printed or shared if desired.*

**Ask Your Doctor**

*Find out how to order*

*Discover your sensitivities*

Your DNA Report can help your doctor optimize your medical regimen by ensuring that you're on the safest and most effective drug.




*Our database continues to grow*

You will receive a notification of any new available reports that are constantly added by our scientists to our genetic database.

nivo Edición Ver Favoritos Herramientas Ayuda

Atrás Búsqueda Favoritos

cción http://www.decode.com/products/

decode genomics Buscar Actualizar ya Correo Ayuda

deCODE genetics

Company Products Services Science News & Events

# Unique products from deCODE science

We apply our discoveries and capabilities in genetics to offer customers and partners market-leading diagnostic tests, personal genome scans, and tools for analyzing and visualizing genomic information

Our Products
deCODEme
deCODE diagnostics
Partnerships & Licensing

deCODE genetics employs its discoveries in a growing range of market-leading DNA-based risk assessment tests that enable individuals, working with their physician, to better understand their risk of disease and to empower better prevention, targeted screening and earlier intervention. deCODE's tests for assessing risk of common diseases are for clinical use and can be ordered with the authorization of physicians or other healthcare professionals, and many of these tests such as those for heart attack and type 2 diabetes are reimbursed by health insurance companies in the U.S. Click on the buttons below to find out more about these tests and how to order them.

## OUR DIAGNOSTIC TESTS

deCODE T2™
Genetic risk test for Type-2 Diabetes

**deCODE T2** defines genetic risk for T2D, independent of

## OUR PERSONAL GENETIC SCANS

deCODEme

Internet

*SEFH*
*Madrid Octubre 2010*

**deCODE BreastCancer™**

The deCODE BreastCancer™ test determines the genotypes for 7 known single-nucleotide polymorphisms (SNPs) that have been linked to genetic predisposition to female breast cancer. The variants are located on chromosomes 2q35 (rs13387042), 5p12 (rs4415084, near the *MRP530* gene), 5q11 (rs889312, near the *MAP3K1* gene), 8q24 (rs13281615), 10q26 (rs1219648, near the *FGFR2* gene), 11p15 (rs3817198, near the *LSP1* gene), and 16q12 (rs3803662, near the *TNRC9/TOX3* gene). Based on an individual's genotypes for these SNP markers, lifetime genetic risk of being diagnosed with breast cancer can be determined and related to the general risk of breast cancer in the population.

**deCODE BreastCancer™ and heritable breast cancer and breast cancer syndromes**

The deCODE BreastCancer™ test does not assess risk from rare, high-penetrance mutations in genes such as *BRCA1*, *BRCA2*, *TP53*, and *PTEN* that confer high risks of familial, early onset breast cancer. These genes are involved in only a very small fraction of breast cancer cases arising in the general population. However some of the variants in the deCODE BreastCancer™ test modify the risk of breast cancer in subjects who carry mutations in the *BRCA1* and/or *BRCA2* genes.

Navigenics®

Member Login | Physician Login | Request Information

(866) 522-1585 / +1 (650) 585-7743

What We Offer | Genetics & Health | For Physicians | About Us | Try Demo

- Overview
- How it works
- Our genetic analysis
- Why Navigenics
- Genetic counseling
- Conditions & medications
- Our policies
- FAQs
- Success stories
- Request information

Receive our newsletter

email address Sign Up

Success story:

# A powerful tool for change

You can now personalize your health strategies with powerful genetic insights. Knowing your genetic risks can help motivate you to take steps towards a healthier life. You can also learn if certain medications work with your genetic makeup, helping you and your doctor choose medications more likely to be safe and effective for you.

## The process is simple

Learn how easy it is to take the first step toward a lifetime of better health.

MORE ›

## We're leading the way

Find out why Navigenics is the trusted choice for personalized genetic analysis.

MORE ›

## Our experts are here for you

Learn more about our board-certified Genetic Counselors, who are available to support you along the way.

MORE ›

## Your privacy is our priority

Internet | Modo protegido: activado

100%

23andMe genetics just got personal.

Search 23andMe Go | Log in | Claim Codes | Blog | Help | Cart

welcome | ancestry | health | how it works | store

## Know yourself. At a molecular level.

Take a journey of self-discovery. With one simple test—all you do is spit in a tube—you can explore the mystery of your own genes.

You'll learn what your genes say about your traits. And learn about your disease risks. So you can team up with your doctor to make better decisions about your health.

And you can delve into your ancestry, finding out where your genes came from and filling out your family tree. Even discover relatives you never knew you had.

It's the most comprehensive genetic test available today. Which is why *Time* magazine called the 23andMe genetic test the 2008 Invention of the Year.

With 23andMe, you and your doctor can determine whether certain medications will be right for you.

**23andMe Health Edition ($429) also includes:**

- Your Carrier Status
- Your Disease Risk

Buy 23andMe Health Edition

## Why do your genetics matter?

**Your genetics can affect your sensitivity to drugs.**

The blood thinner Warfarin (Coumadin®) can help prevent blood clots, but it can also cause excessive bleeding in people whose sensitivity to this drug is increased by two genetic variations covered by 23andMe.

**Your DNA can impact how effective drugs will be.**

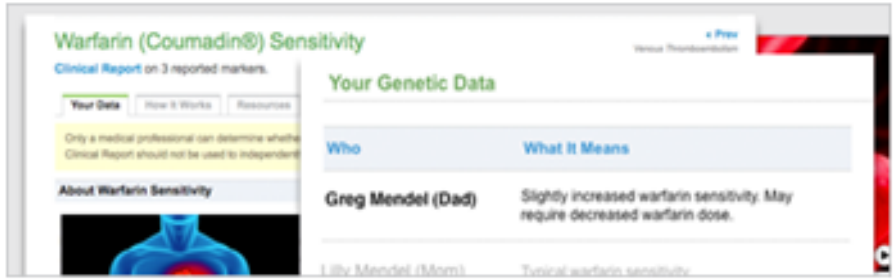
Clopidogrel (Plavix®) helps prevent heart attacks by keeping blood cells from sticking together. But a genetic variation that interferes with the drug's metabolism prevents some people from getting the full effect.

**Genetics can determine if you'll have side effects.**

Two genetic variations analyzed by 23andMe can increase the chances of experiencing severe muscular pain and weakness when taking high doses of cholesterol-lowering statins.

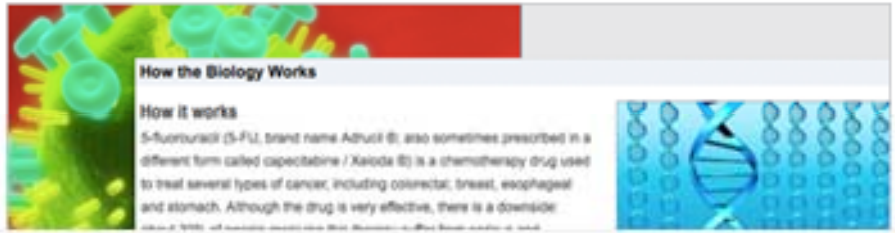
»See our health reports on 174 diseases and conditions.

## Not all drugs are right for all people.




**Genetics can affect how well some drugs work for you—or whether they will work at all.** Knowledge about variations in your DNA can help your doctor determine if you need more or less of a medication compared to most people, or whether you might be at increased risk for certain serious side effects.

## Easy to understand explanations at every step.




Internet | Modo protegido: activado

*SEFH*
*Madrid Octubre 2010*

# Conclusiones

La farmacogenética-farmacogenómica es una disciplina consolidada en sus bases, pero emergente en sus aplicaciones

El farmacéutico de hospital, en cuanto a tal, debe manejar los datos derivados de esta actividad con el claro objetivo de la optimización racional de la farmacoterapia.

Por ello, empleará la evidencia científica relevante valorando siempre los aspectos de eficiencia, en un mejor servicio a la sociedad, tanto en la selección de un fármaco como en el establecimiento de sus condiciones de empleo

La Sociedad Española de Farmacia Hospitalaria, de forma proactiva, debería ofertar las ayudas y herramientas que faciliten la tarea de sus asociados