SEARCH FOR A POTENTIALLY PREDICTIVE GLYCOBIOLOGICAL SIGNATURE OF THE TRANSITION FROM ULCERATIVE COLITIS TO COLITIS-ASSOCIATED COLORECTAL CANCER

Final Engineering Project — Bachelor of Biotechnology

Lucía Castelli — 2025

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Universidad Argentina de la Empresa (UADE)
Functional and Molecular Glycomics Laboratory
Institute of Biology and Experimental Medicine – IBYME
CONICET

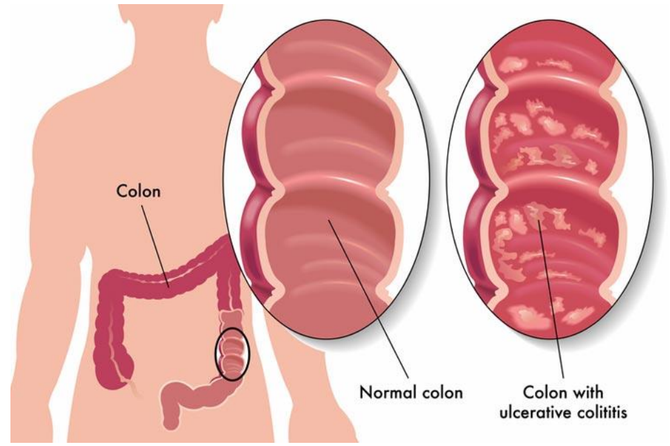
INTRODUCTION: BACKGROUND

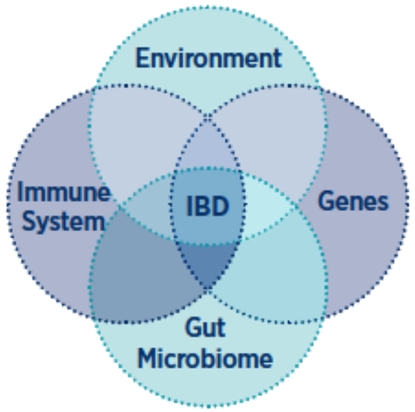
INFLAMMATORY BOWEL DISEASES

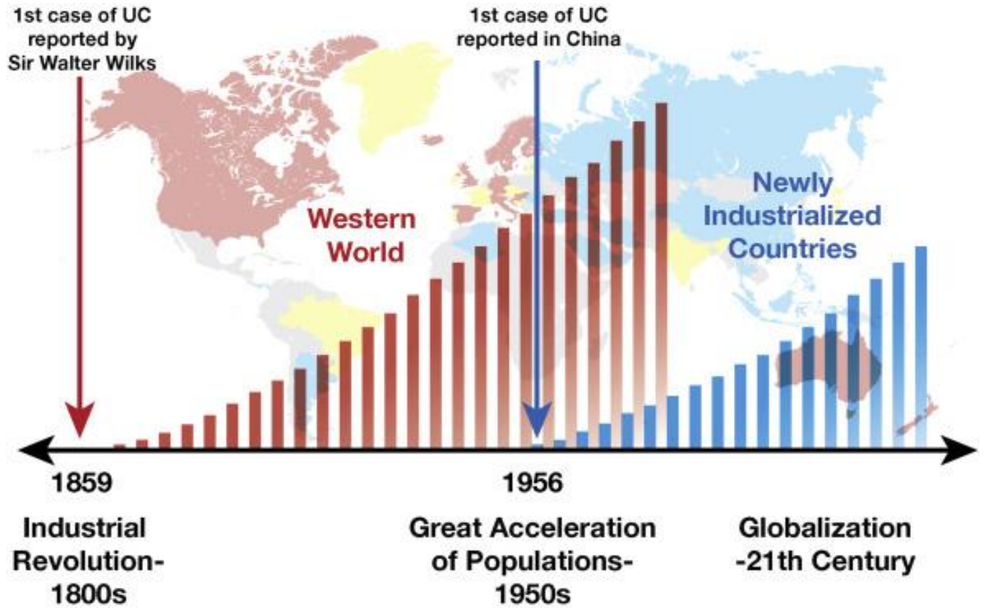
About Inflammatory Bowel Disease (IBD)

Information from the American College of Gastroenterology on Ulcerative Colitis and Crohn's Disease

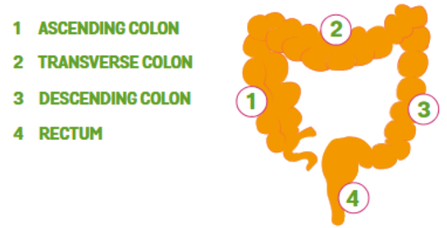
INFLAMMATORY BOWEL DISEASE (IBD) is an umbrella term for the chronic gastrointestinal inflammatory conditions **ulcerative colitis and Crohn's disease.**







Kaplan et al (2017). Understanding and Preventing the Global Increase of Inflammatory Bowel Disease.



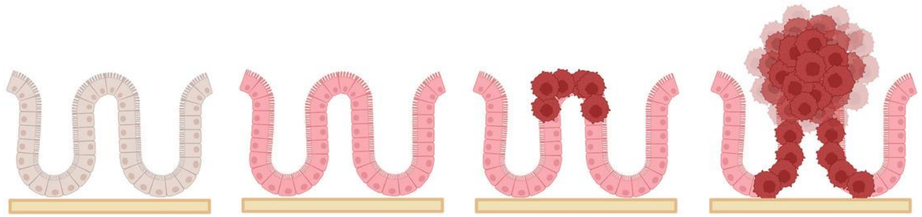
MAIN TYPES OF ULCERATIVE COLITIS

PROCTITIS (E1)

LEFT-SIDED (DISTAL) COLITIS (E2)

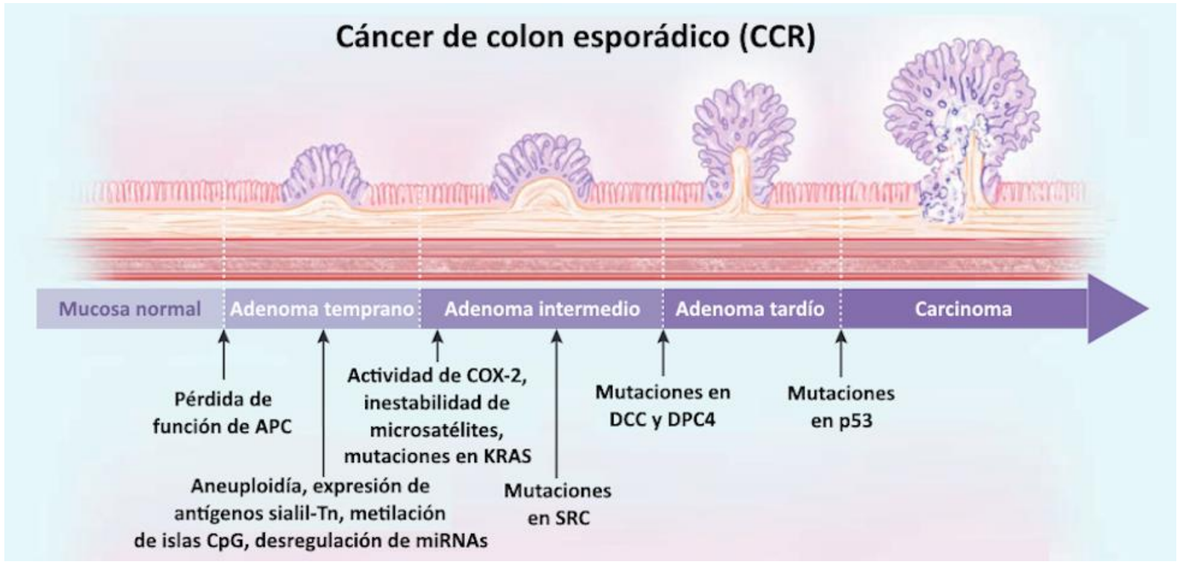
TOTAL COLITIS (E3)

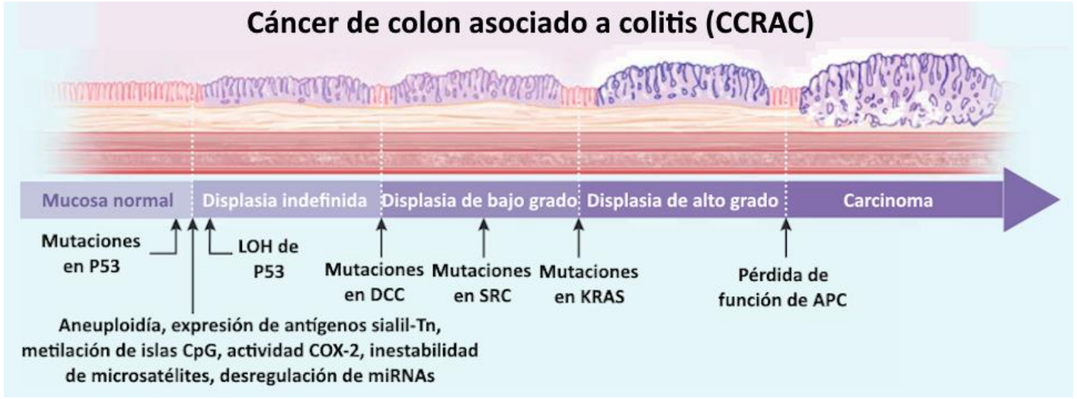
SPORADIC COLORECTAL CANCER ASSOCIATED WITH COLITIS



Normal ⟶ Inflammation ⟶ Dysplasia ⟶ Cancer

Ferlay, et al. (2024). Cancer today – : https://gco.iarc.who.int/today/

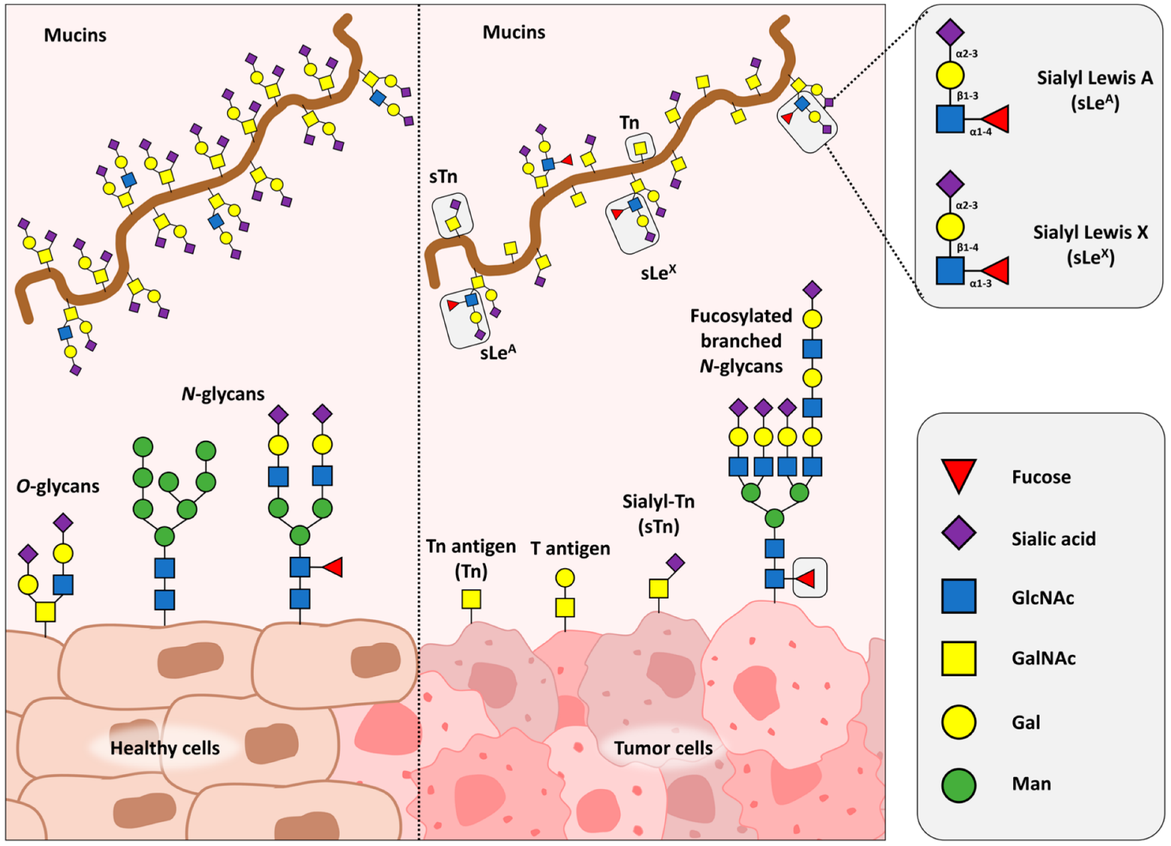




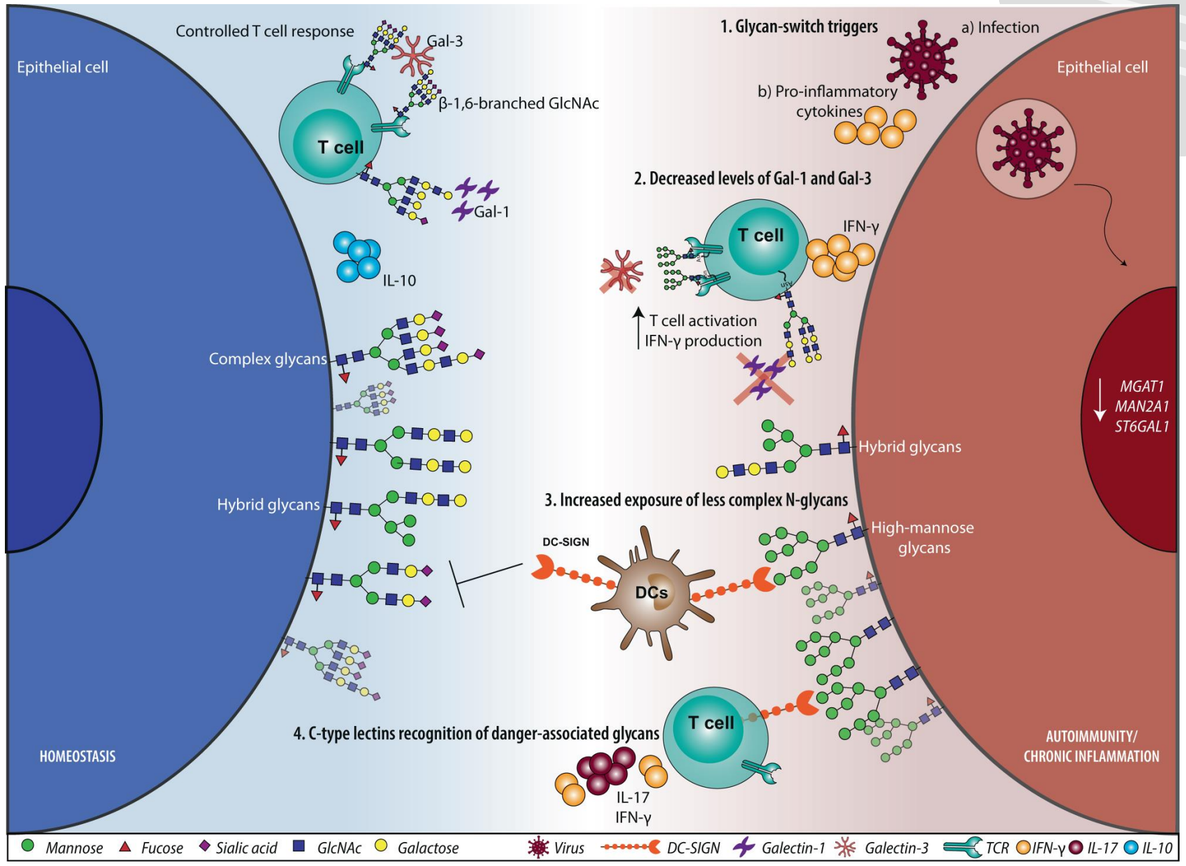
Beaugerie e Itzkowitz (2015). Cancers Complicating Inflammatory Bowel Disease. Doi: 10.1056/NEJMra1403718

Background

GLYCOBIOLOGY AS A TRANSVERSAL DISCIPLINE IN BIOMEDICAL SCIENCES

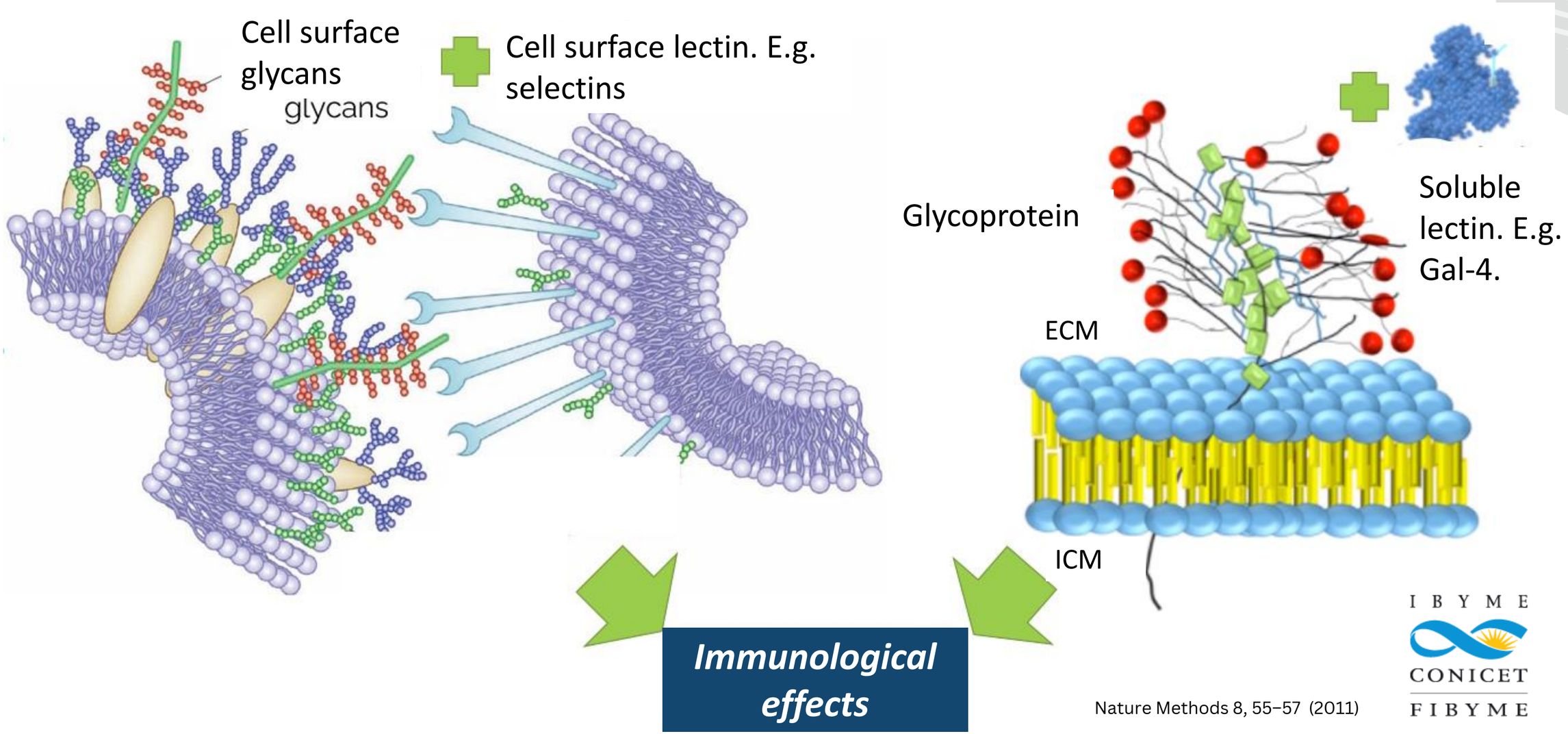


The Blessed Union of Glycobiology and Immunology: A Marriage That Worked, Medicines 2023



Immune regulatory networks coordinated by glycans and glycan-binding proteins in autoimmunity and infection, Pinho et al, Cell Mol Immunol 2023

LECTINS DECODE GLYCAN INFORMATION AND INITIATE IMMUNE RESPONSES



Nature Methods 8, 55–57 (2011)

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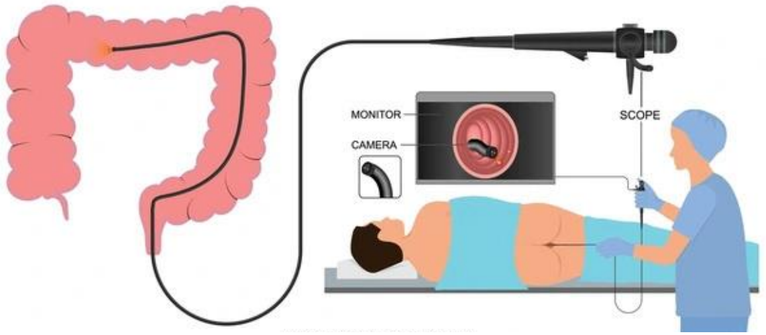
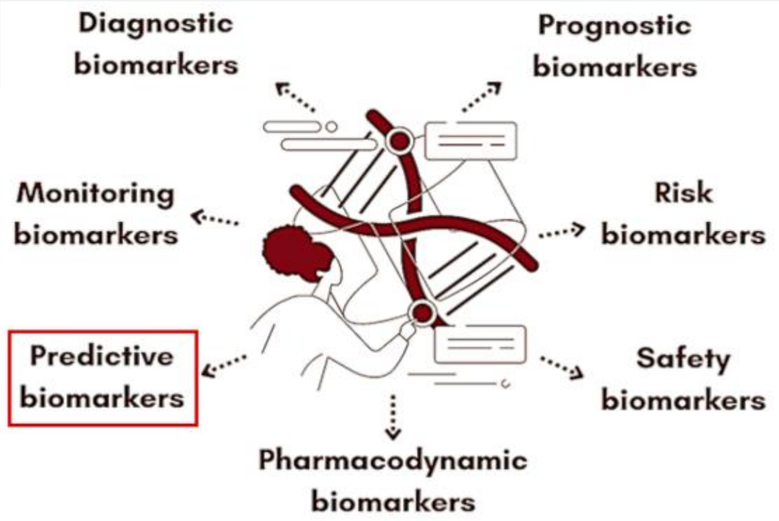
CONICET
F I B Y M E

HYPOTHESIS

HYPOTHESIS AND GENERAL OBJECTIVE

Glycogenes (related to glycosylation and lectins) could be dysregulated in neoplasm associated with intestinal inflammation, and their study would allow us to identify a signature of expression predictive of the development of neoplasia in these patients.





OBJECTIVES

SPECIFIC OBJECTIVES

#1

Develop and validate a glycogene signature based on samples from **patients** with ulcerative colitis (UC) and neoplasia.

#2

To comparatively analyze the glycogene signature obtained in UC with and without neoplasia in experimental **models** of colitis and CCRAC.

#3

Validate the expression profiles associated with the development of CCRAC in murine models by **RT-qPCR**

DEVELOPMENT OF BIOINFORMATICS TOOLS

Visualización de expresión diferencial

p-valor

0.05

logFC

2

Up: 12, down: 7

Seleccioná los datos para mostrar:

- (•) Ejemplo (firma)
- ( ) Subir .csv

Refrescar tabla

Tabla | Gráfico | NCBI | Más Información

An official website of the United States government Here's how you know

NIH National Library of Medicine
National Center for Biotechnology Information

Gene: Gene — Defa5

Create RSS search | Save Advanced

Gene sources: Genomic

Catego...: Alternatively spliced | Annotated genes | Protein-coding | Pseudogene

Seque... content: CCDS | Ensembl

Tabular | 20 per page | Sort by Relevance

Send to:

GENE Was this helpful?

DEFA5 – defensin alpha 5

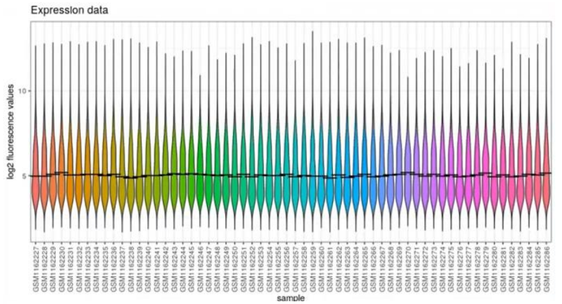
Homo sapiens (human)

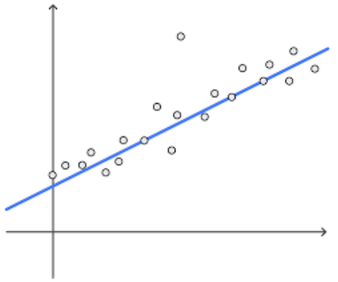
Also known as: DEF5, HD-5

https://lcastelli.shinyapps.io/degs/

Degfind

R package for differential expression analysis in bulk (RNA-seq and microarrays). Eight (8) functions for raw data handling, QC, graphing, and statistical analysis.





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                                ID logFC AveExpr     t P.Value adj.P.Val     B
4282  IG_821_1300838_1300922_fwd_st -3.32    12.4 -23.1 7.2e-09   5.3e-05 8.017
5365                  serA_b2913_st  2.78    12.2  15.8 1.6e-07   6.0e-04 6.603
1389                  gltD_b3213_st  3.03    10.9  13.3 6.4e-07   1.6e-03 5.779
4625                   lrp_b0889_st  2.30     9.3  11.4 2.3e-06   4.0e-03 4.911
```

appliedbiosystems

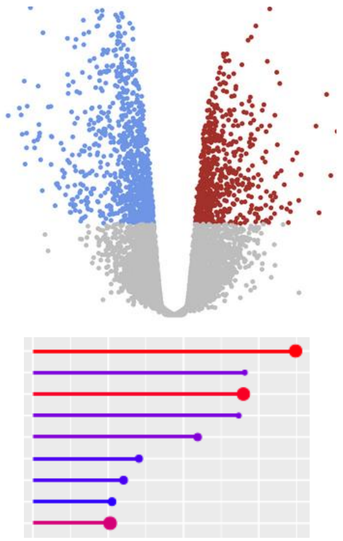
Transcriptome Analysis Console (TAC) Software

Fast, intuitive software for deciphering the complexity of the transcriptome

EXPERIMENTAL DESIGN

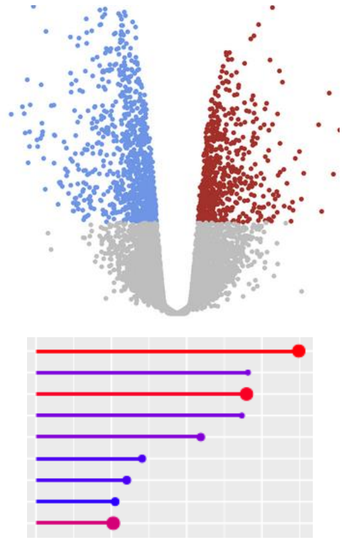
In silico

CU / Healthy



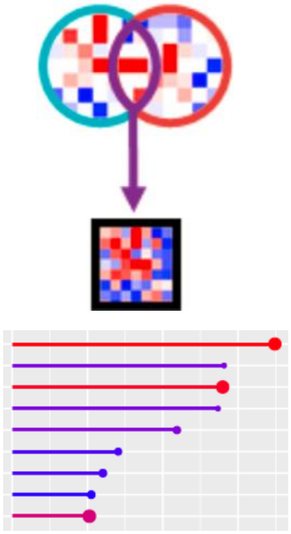
- General (GSE224758, 37283, 73661, 87473, 92415, 206285)
- qUC (GSE37283)

Displasia / CU



- Pancolitis (GSE47908)
- CU-I (GSE47908)

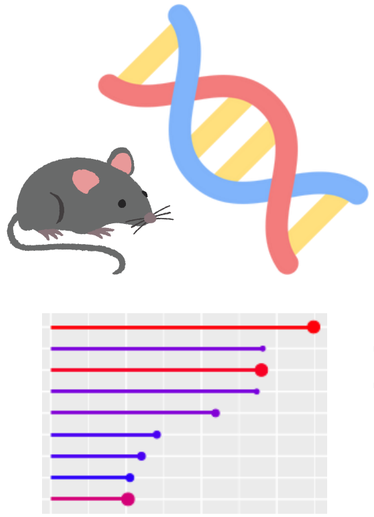
CCRAC / CU



- CCRAC / pancolitis (GSE3629)
- Pancolitis / CU-I (GSE47908)

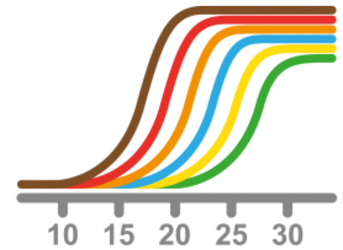
Patients

Glycobiological signature



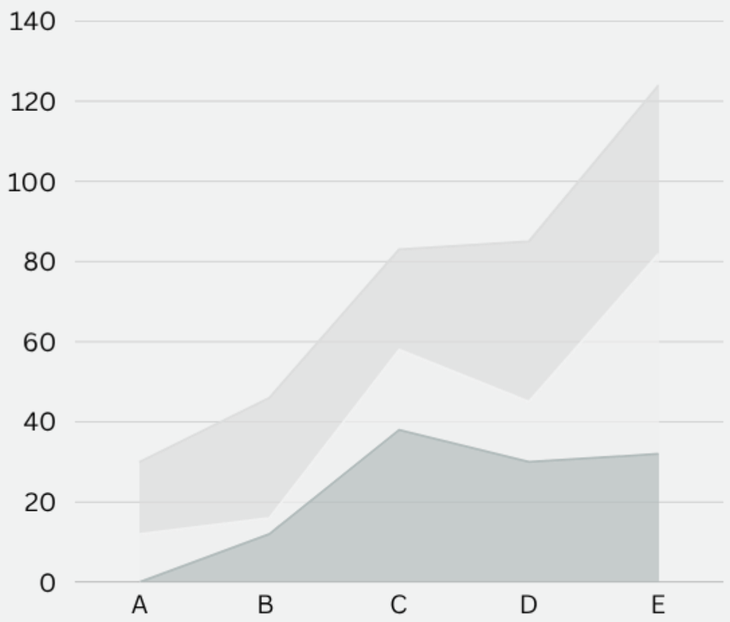
- Adenocarcinoma (AOM-DSS) / Inflammation (DSS) (GSE31106)

RT-qPCR



Murine models

In vivo

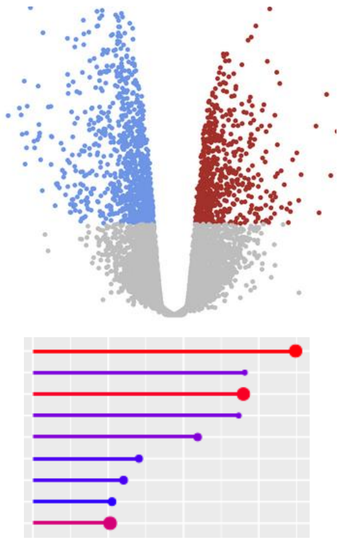


RESULTS

EXPERIMENTAL DESIGN

In silico

CU / Healthy



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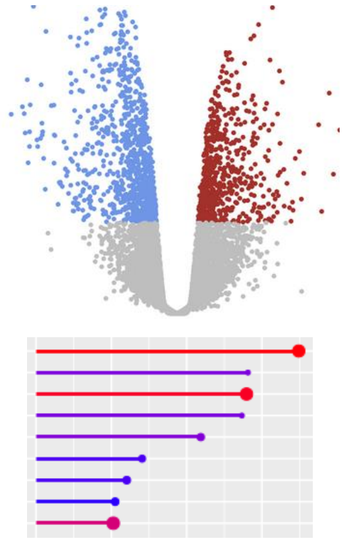

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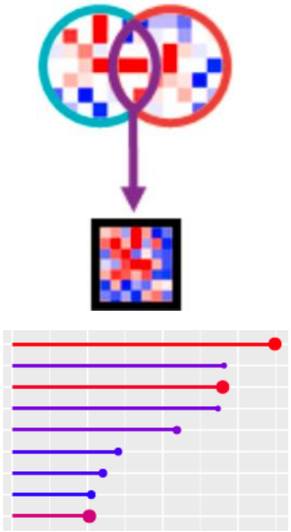
CCRAC / CU



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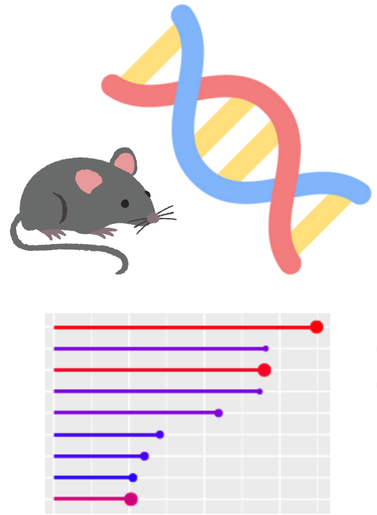
Patients

Glycobiological signature



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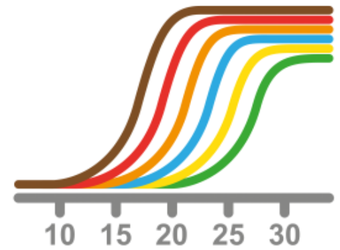
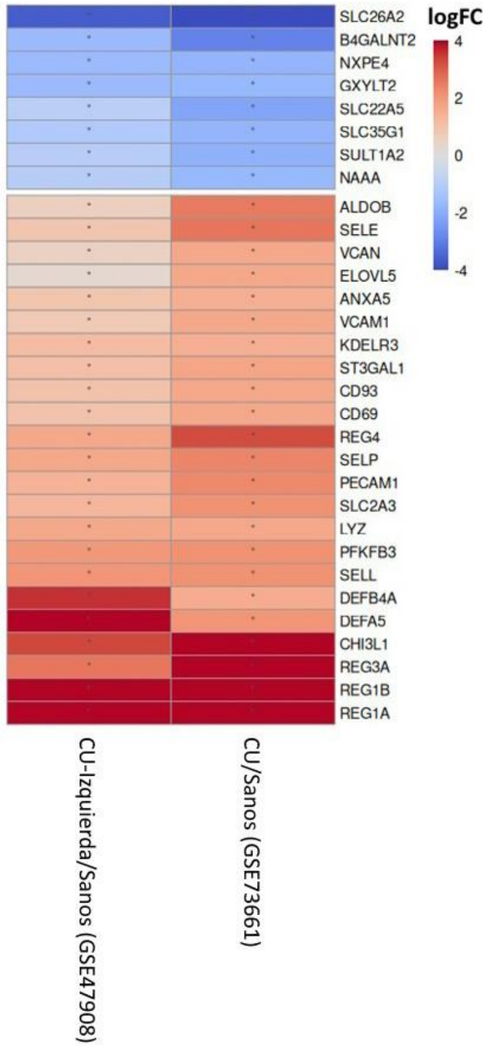


Murine models

In vivo

UC / HEALTHY

Glycogenes



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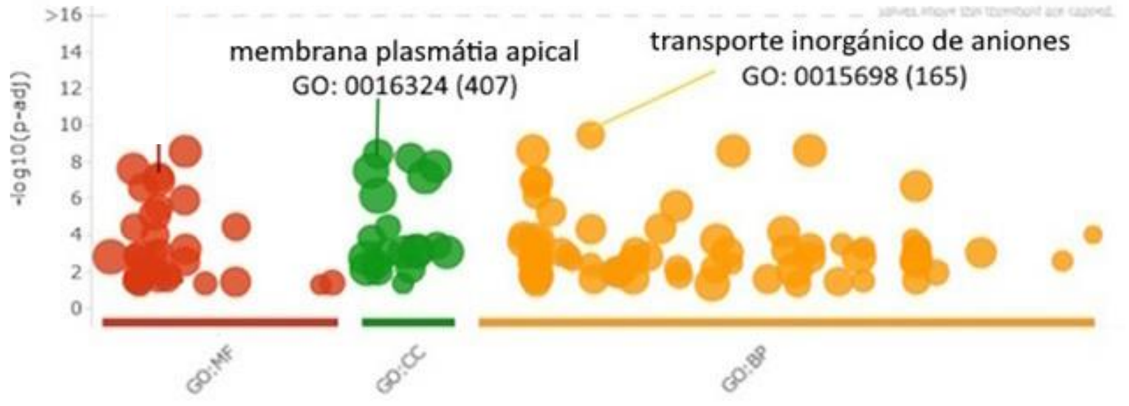

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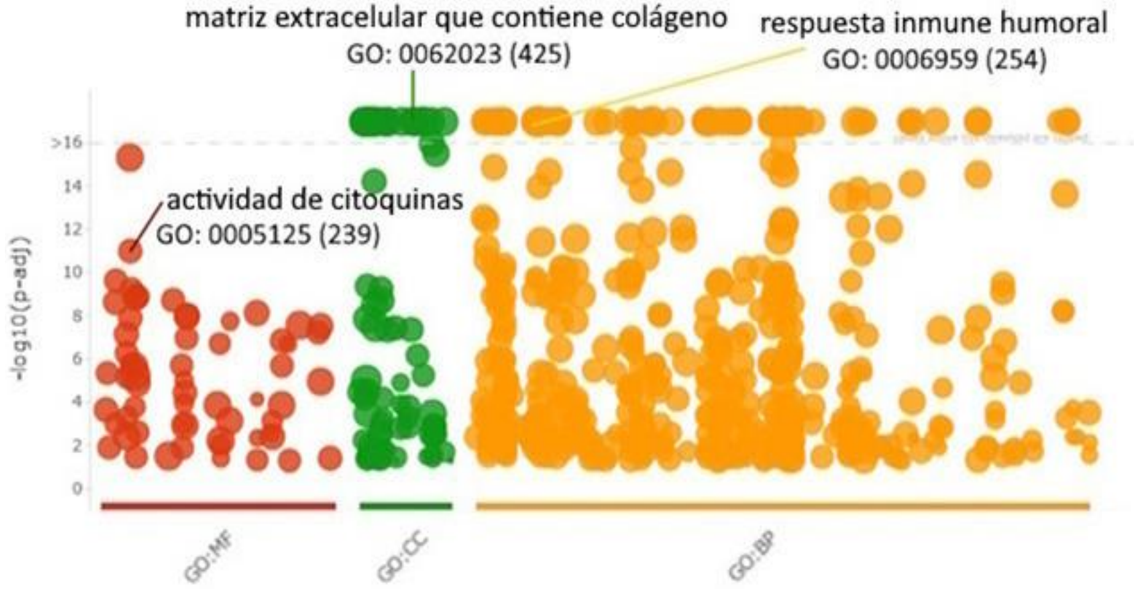
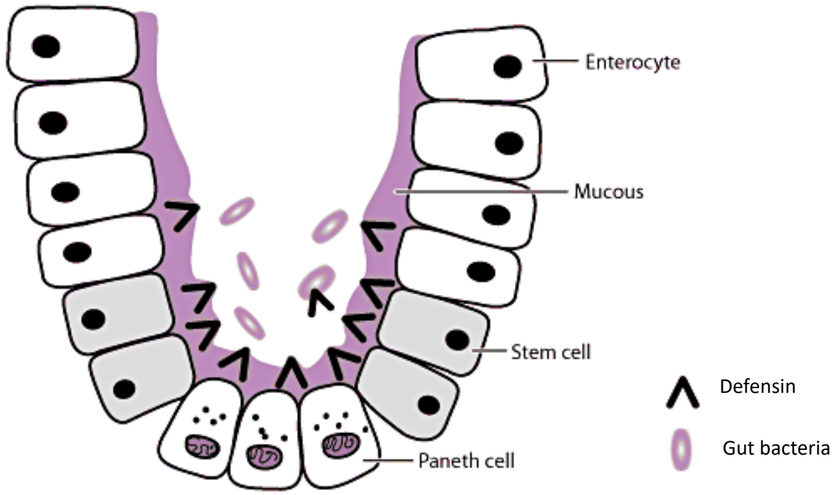
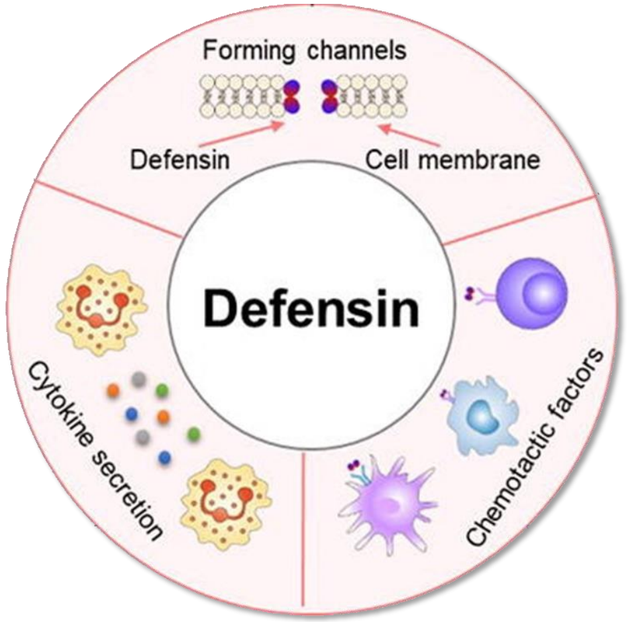


DEFA5

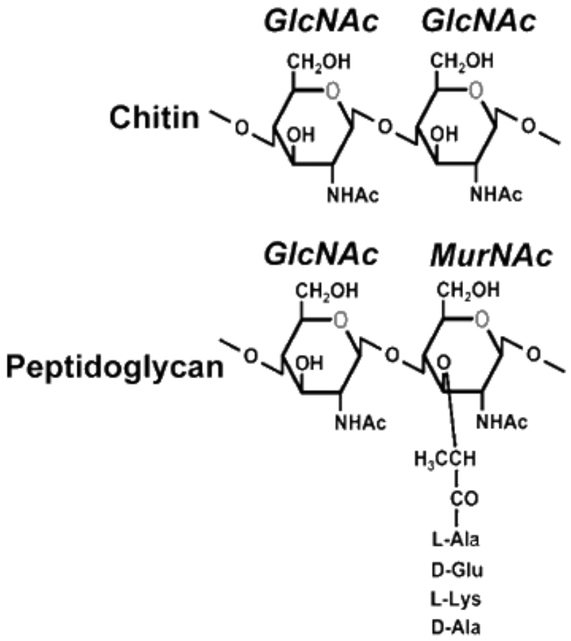


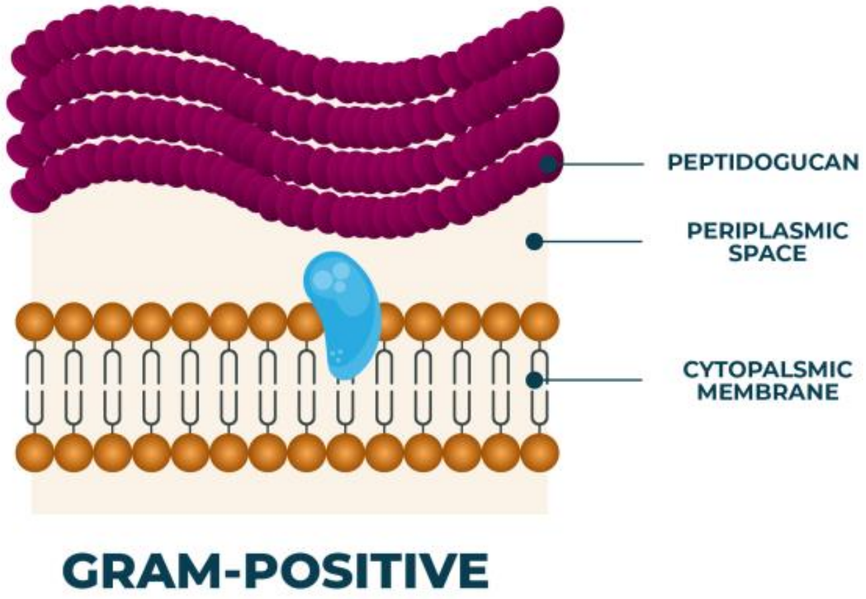


Gao et al (2021). Defensins: The natural peptide antibiotic. Doi: 10.1016/j.addr.2021.114008

- Not expressed in healthy tissue
- ↑ in UC, proposed as a biomarker vs CD

CHI3L1

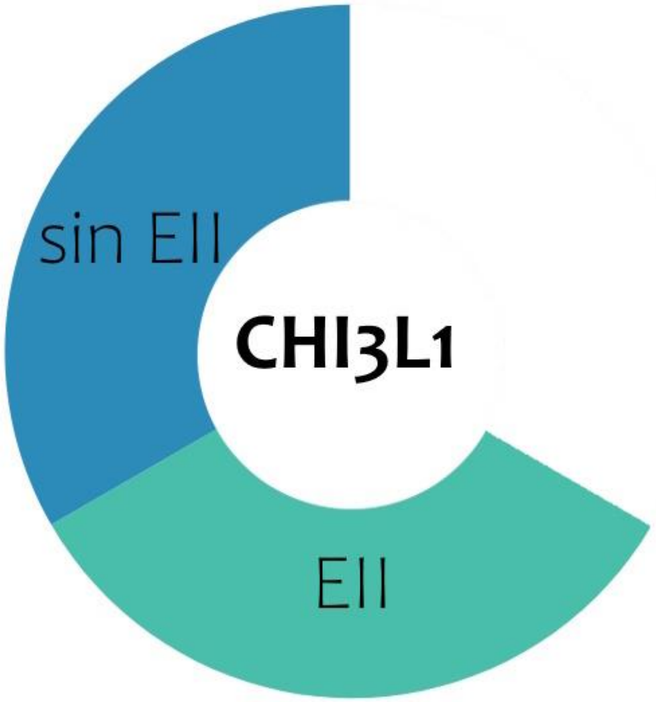




Anchoring

commensal

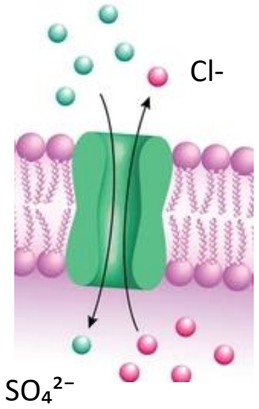
bacteria

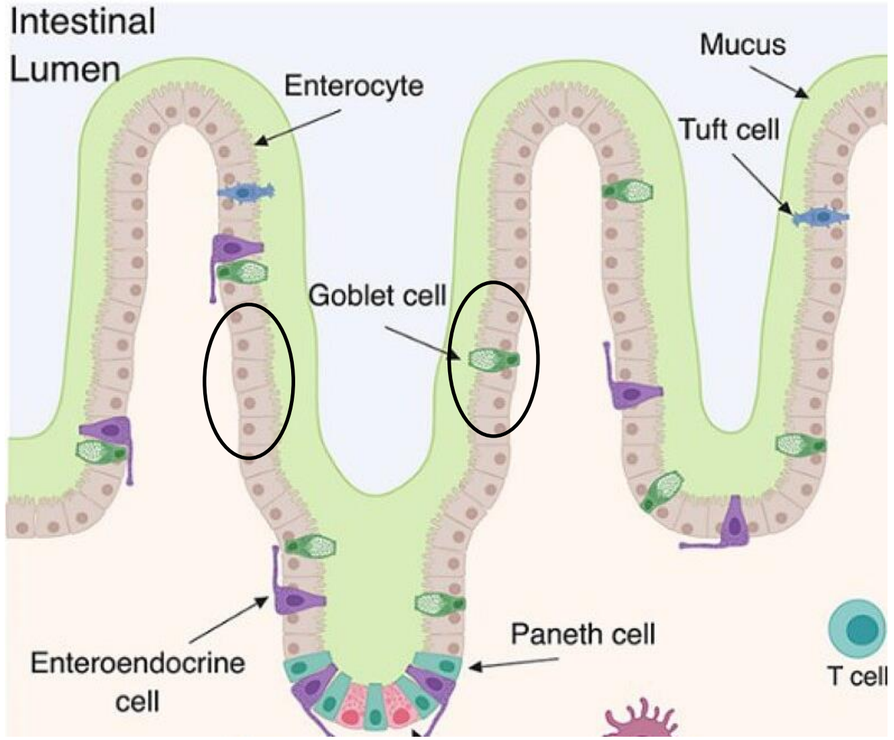


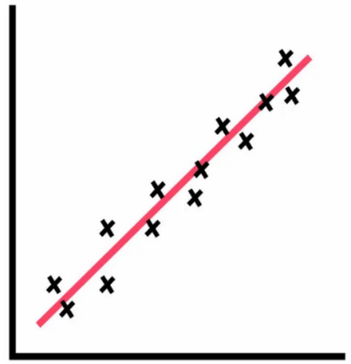
- ↑ in serum (CU)
- Expression associated with immune cells
- Chronic inflammation: Wnt/β-catenin

Results

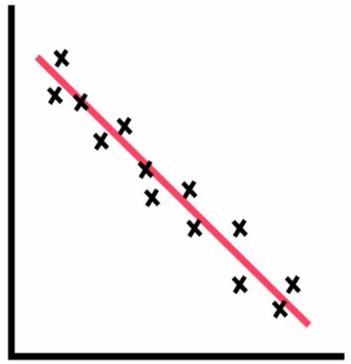
SLC26A2







Uniones estrechas



IL-17

- ↓ on active CU and DSS models
- Key in mucin sulfation, reduced in IBD

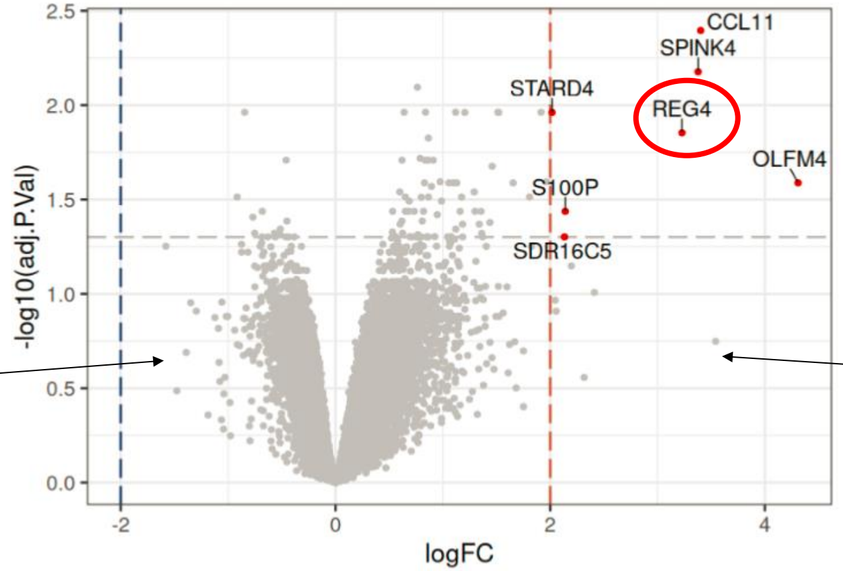
REMISSION STATUS

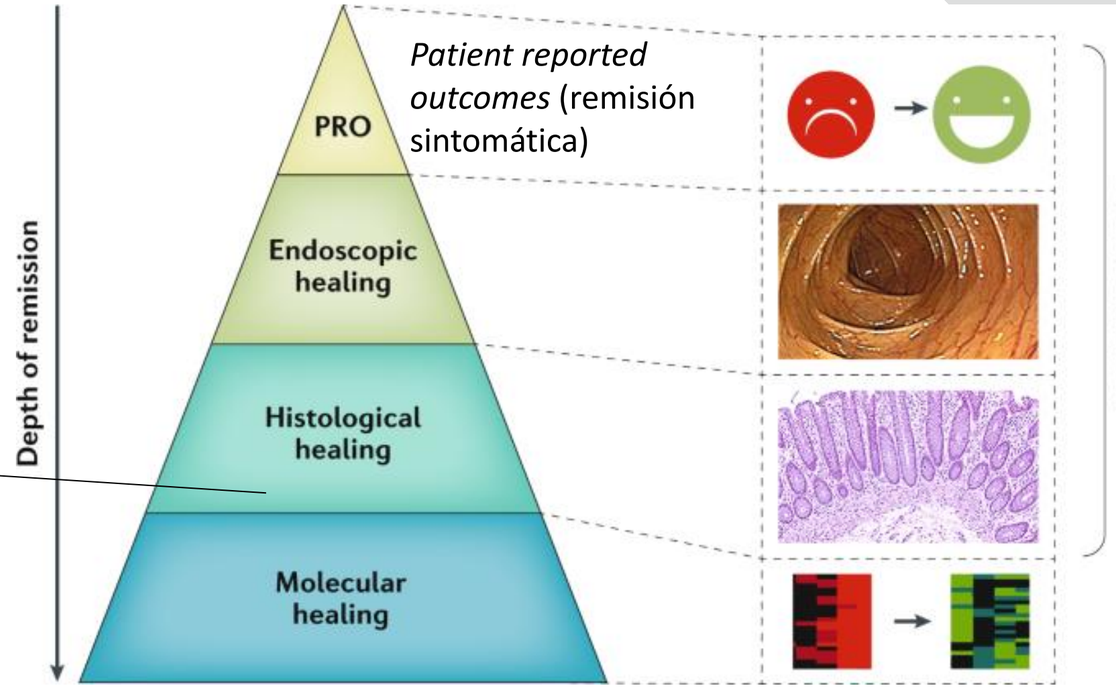
In histological remission there are glycobiological alterations

Moderate UC

Endoscopic remission

CU quiescente / Sanos (GSE37283)





Dalal et al (2021), Two Strikes but Not Out: Deep Remission of Ulcerative Colitis with Ustekinumab After Primary Non-response to Infliximab and Vedolizumab. Doi: 10.1007/s10620-021-06852-3

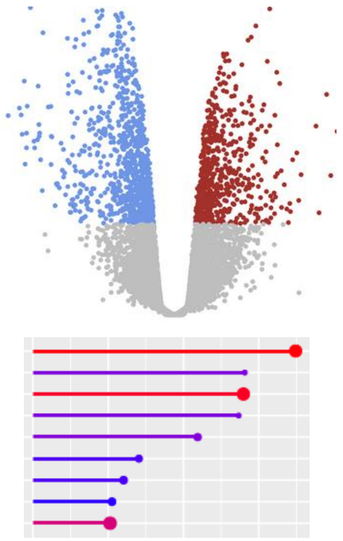
Danese et al (2020). Evolving therapeutic goals in ulcerative colitis: towards disease clearance. Doi: doi.org/10.1038/s41575-019-0211-1

Results / Partial conclusions

EXPERIMENTAL DESIGN

In silico

CU / Healthy



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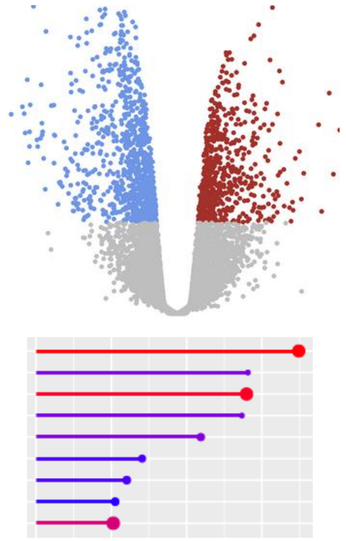
Displasia / CU



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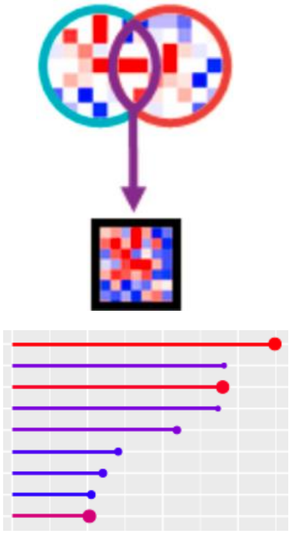
CCRAC / CU



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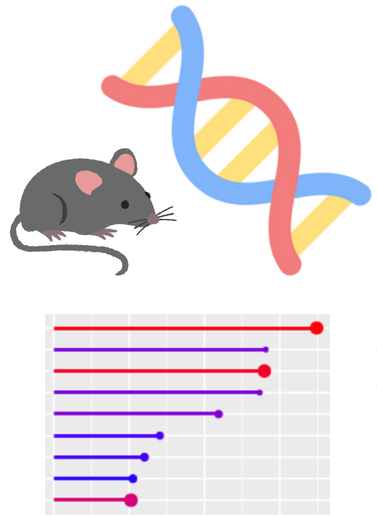
- Pancolitis / CU-I (GSE47908)

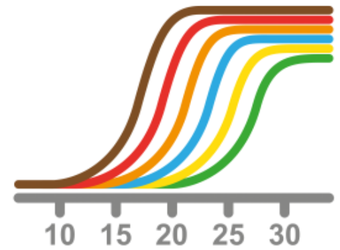
Patients

Glycobiological signature



- Adenocarcinoma (AOM-DSS) / Inflammation (DSS) (GSE31106)

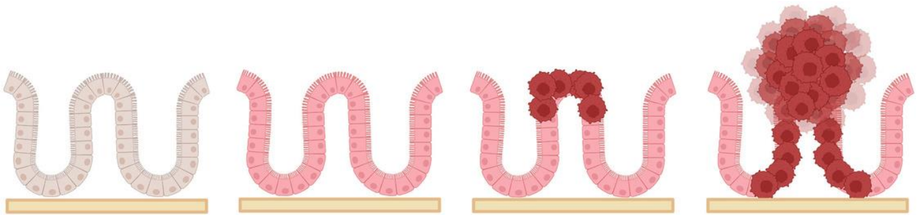
RT-qPCR



Murine models

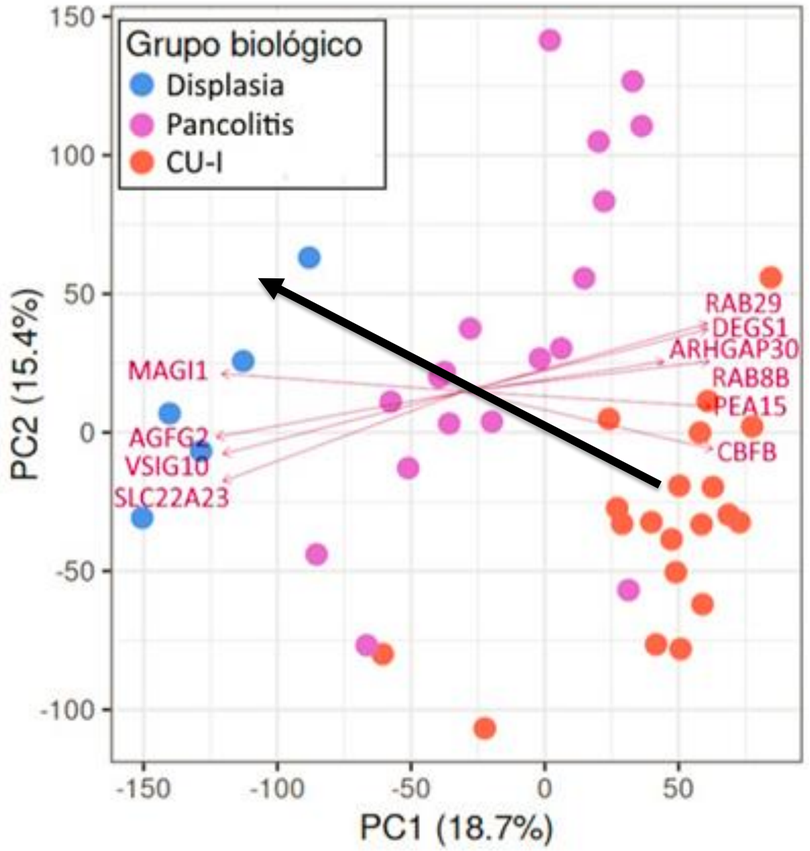
In vivo

DYSPLASIA / UC



Normal ⟶ Inflammation ⟶ Dysplasia ⟶ Cancer

(E1) (E2) (E3)

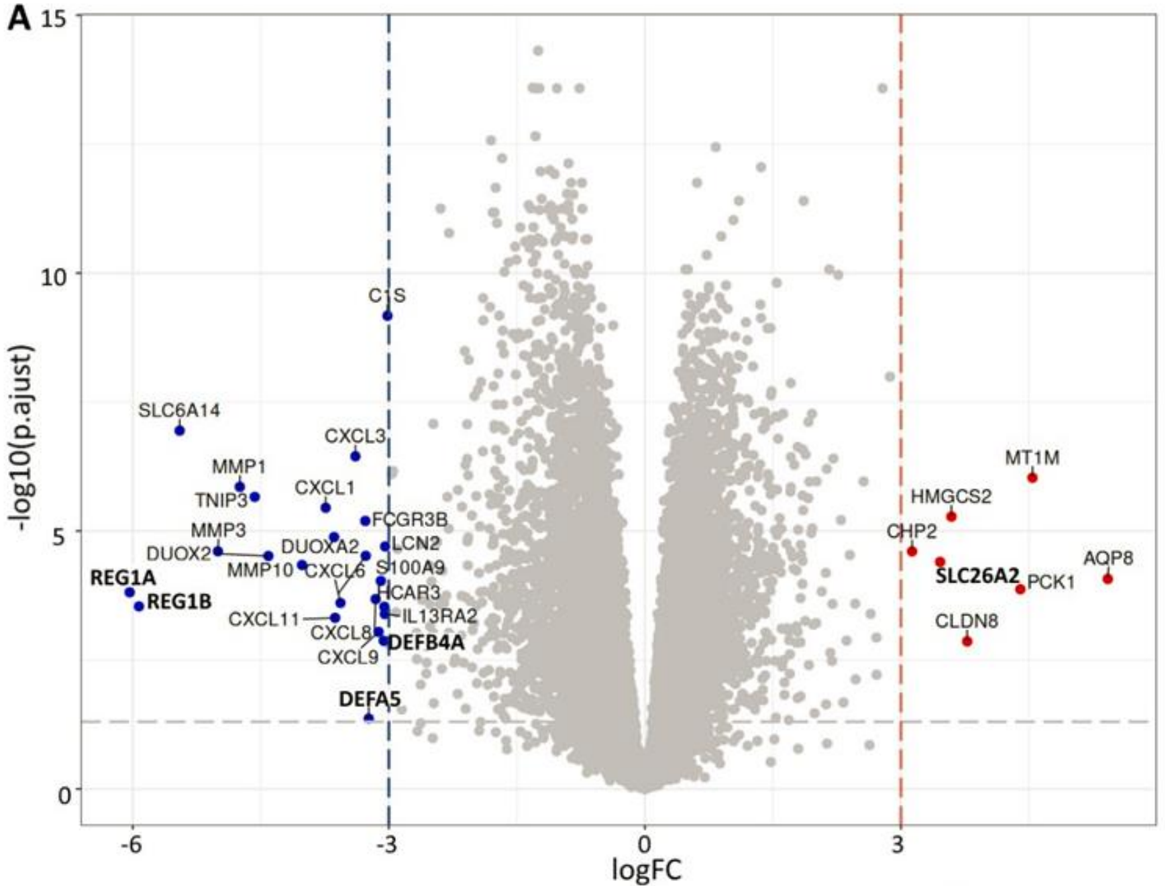


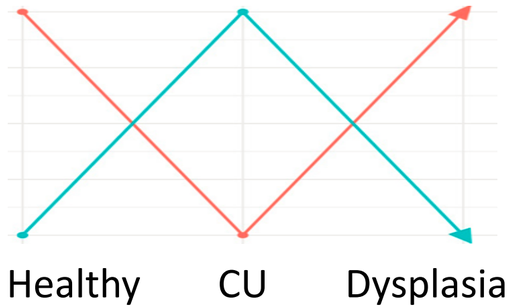
Pancolitis (E3) is molecularly closer to dysplasia than left UC (E2)

DYSPLASIA / LEFT UC

Glycogene dysregulation patterns are opposite from healthy to inflamed and then dysplastic tissue

Dysplasia/left UC





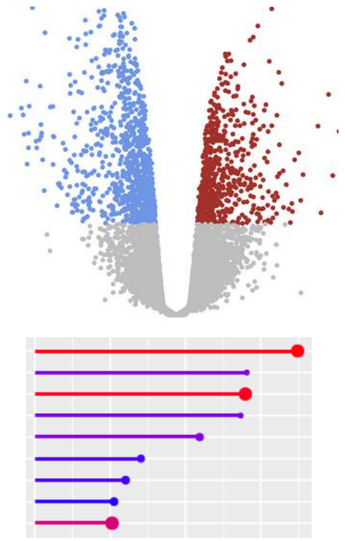
SLC26A2, AQP8, CLDN8, DEFB1

SELL, CHI3L1, MMP1, CXCL1, REG1A, DEFA5

EXPERIMENTAL DESIGN

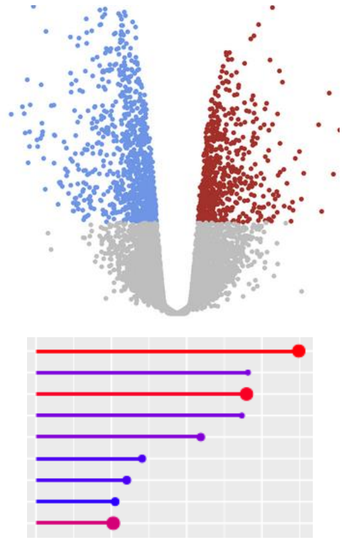
In silico

CU / Healthy



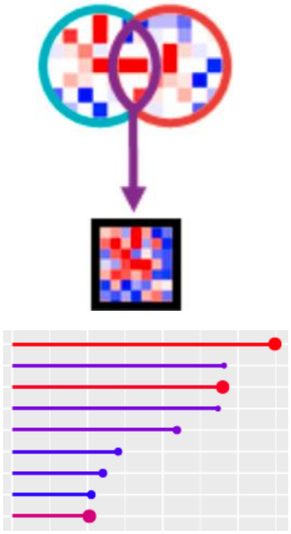
- General (GSE224758, 37283, 73661, 87473, 92415, 206285)
- qUC (GSE37283)

Displasia / CU



- Pancolitis (GSE47908)
- CU-I (GSE47908)

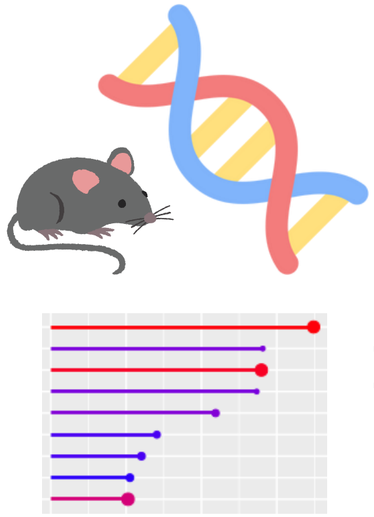
CCRAC / CU



- CCRAC / pancolitis (GSE3629)
- Pancolitis / CU-I (GSE47908)

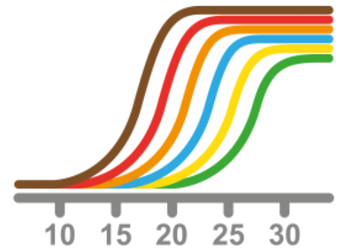
Patients

Glycobiological signature



- Adenocarcinoma (AOM-DSS) / Inflammation (DSS) (GSE31106)

RT-qPCR

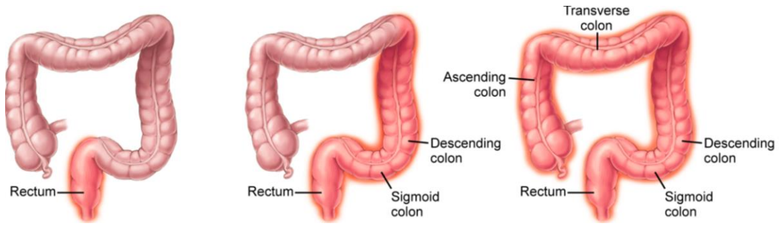


Murine models

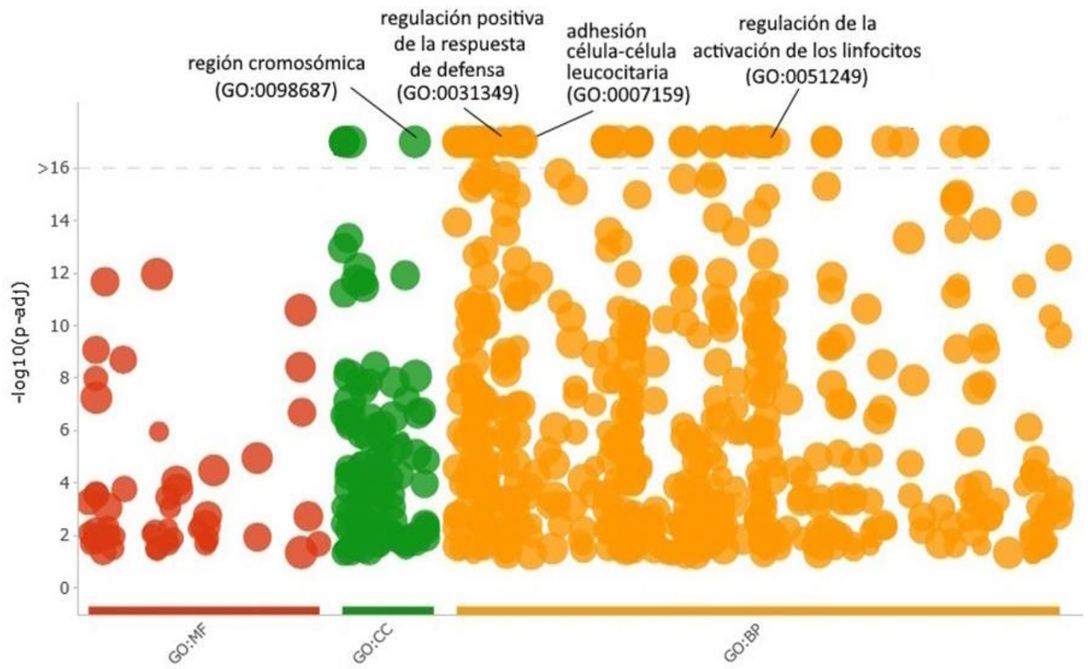
In vivo

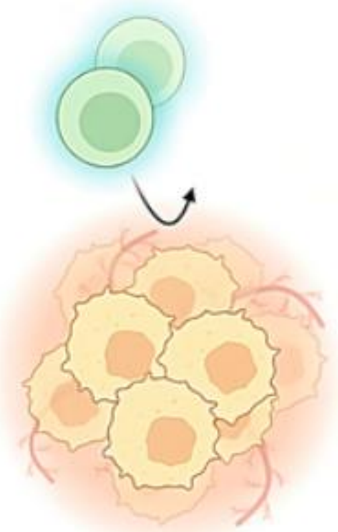
UC AND CACRC / LEFT UC

Left UC (E2) ➔ Pancolitis (E3) ➔ UC+ **CACRC**



Cumulative Inflammatory Burden (CIM)
(Carga inflamatoria acumulativa)



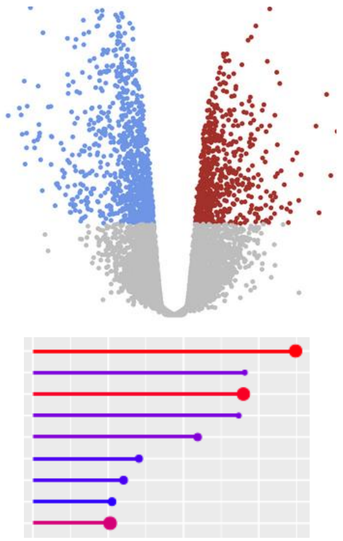


Results

EXPERIMENTAL DESIGN

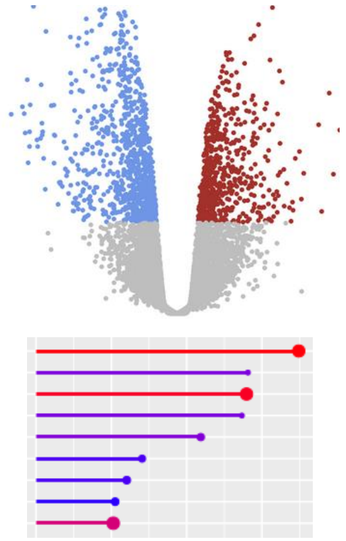
In silico

CU / Healthy



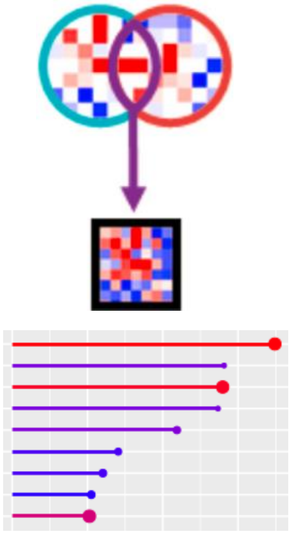
- General (GSE224758, 37283, 73661, 87473, 92415, 206285)
- qUC (GSE37283)

Displasia / CU



- Pancolitis (GSE47908)
- CU-I (GSE47908)

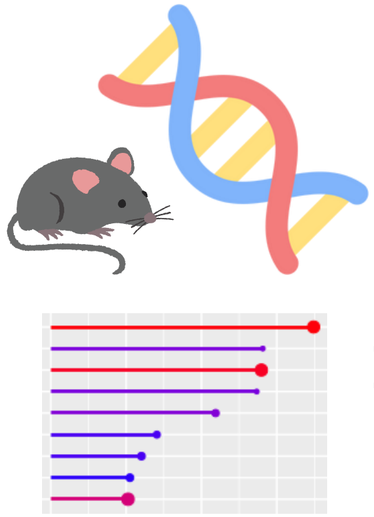
CCRAC / CU



- CCRAC / pancolitis (GSE3629)
- Pancolitis / CU-I (GSE47908)

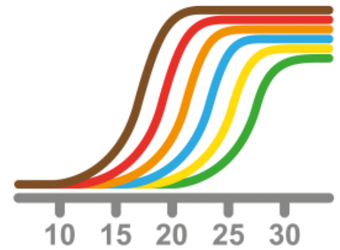
Patients

Glycobiological signature



- Adenocarcinoma (AOM-DSS) / Inflammation (DSS) (GSE31106)

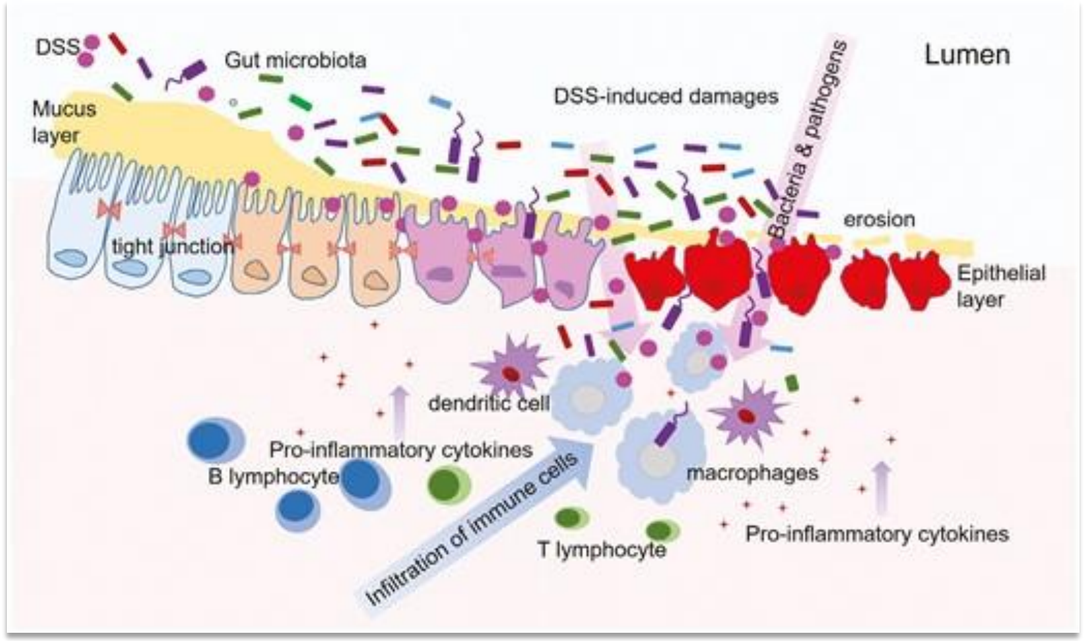
RT-qPCR

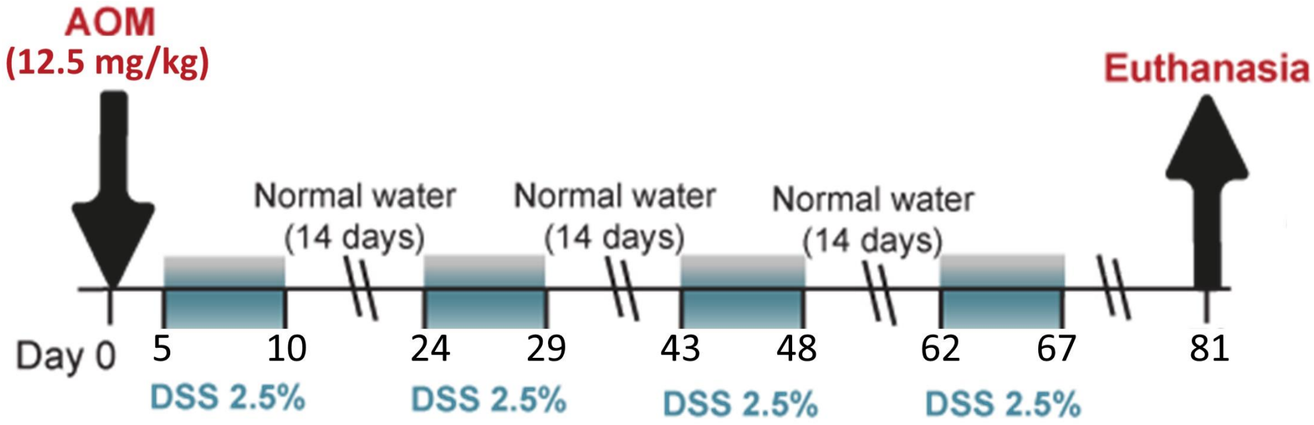


Murine models

In vivo

MURINE MODEL OF CACRC INDUCED BY AOM-DSS



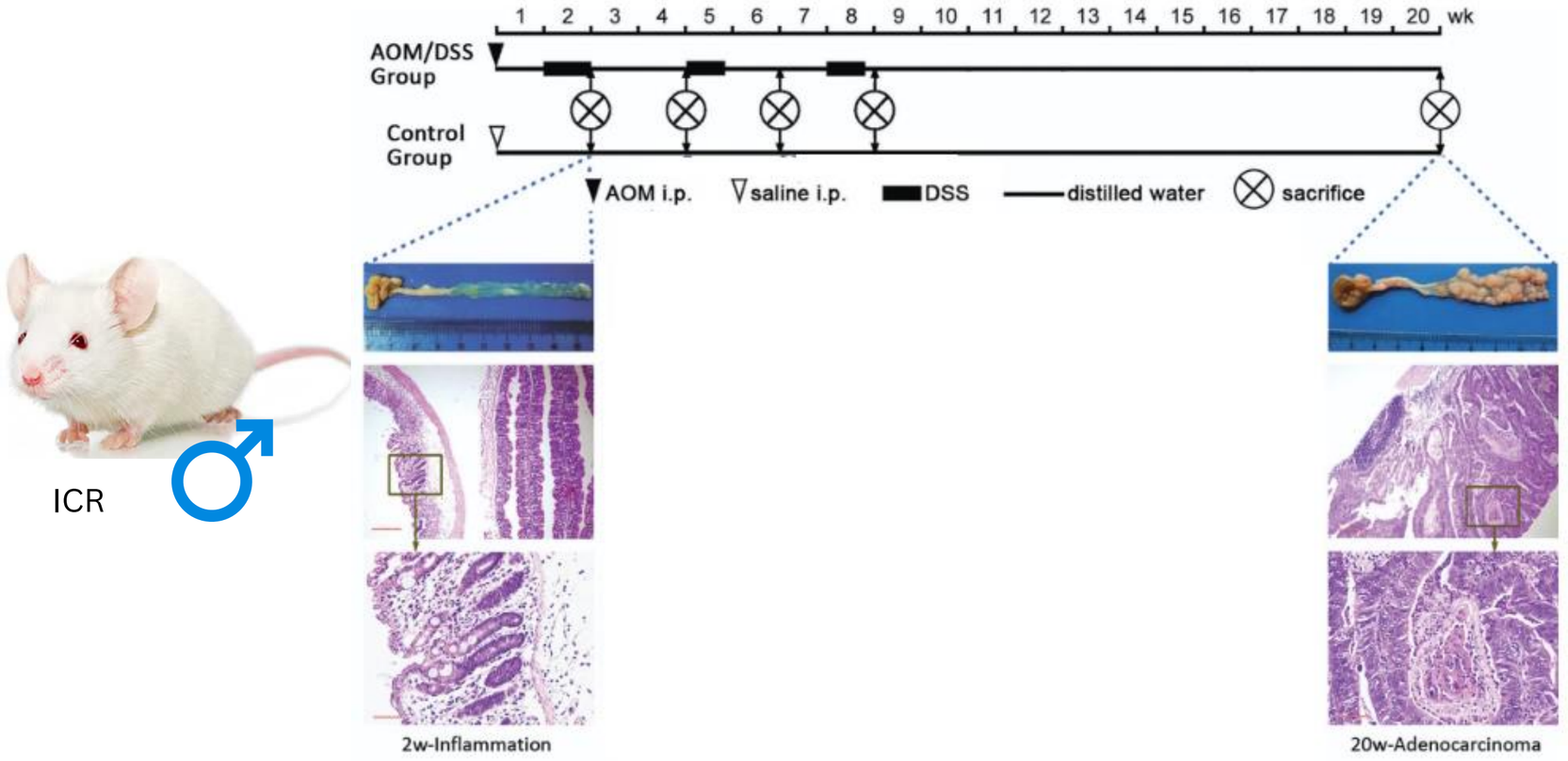


Chunhua et al. (2024). Unveiling Colitis: A Journey through the Dextran Sodium Sulfate-induced Model, Inflammatory Bowel Diseases. Doi: 10.1093/ibd/izad312

Results

ADENOCARCINOMA VS INFLAMED

In transcriptomics databases, corresponding to the AOM-DSS model



Tang, A., et al (2012). Dynamic activation of the key pathways: linking colitis to colorectal cancer in a mouse model.
Doi: 10.1093/carcin/bgs183

ADENOCARCINOMA VS INFLAMED

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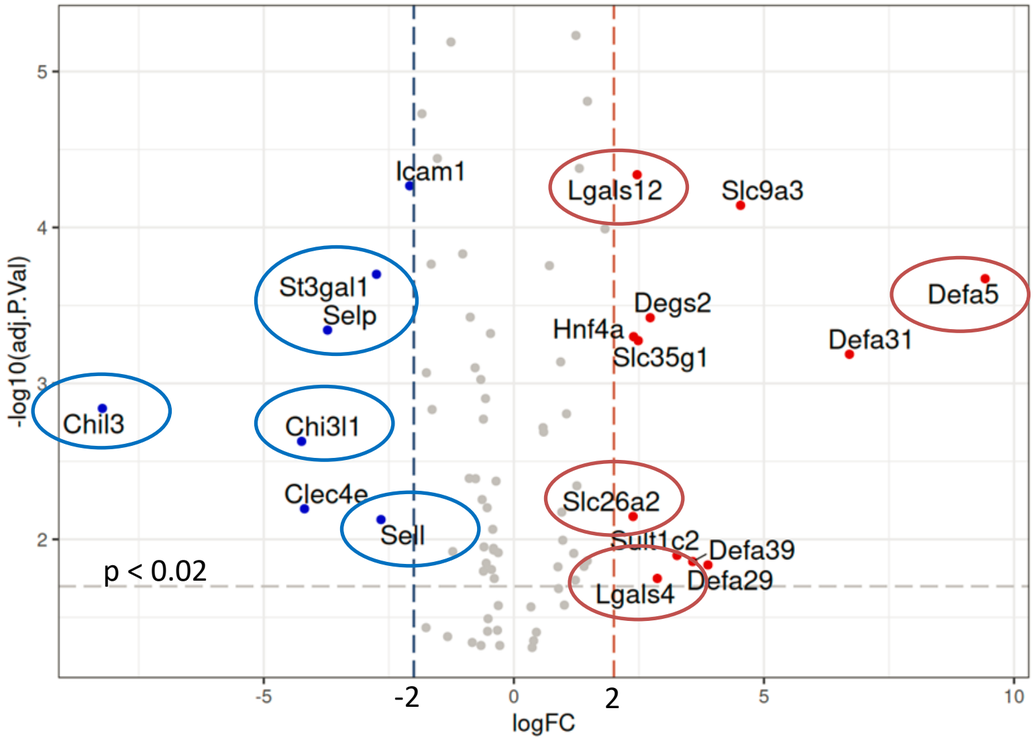
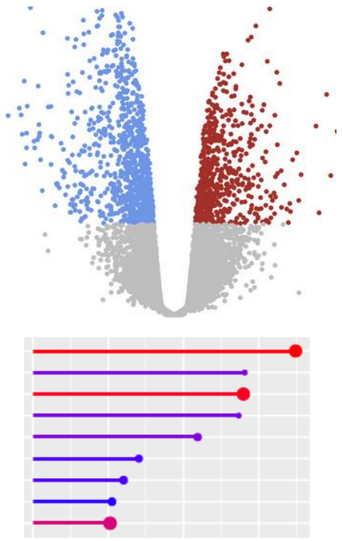


Ratón	Ortólogo humano	Nombre del gen
Defa5	DEFA5	Defensina 5
Lgals4	LGALS4	Galectina 4
Lgals12	LGALS12	Galectina 12
Slc26a2	SLC26A2	Miembro 2 de la familia de portadores de solutos 26
Icam1	ICAM1	Molécula de adhesión intercelular 2
Sell	SELL	Selectina L
Selp	SELP	Selectina P
St3gal1	ST3GAL1	ST3 Beta-galactósido alfa-2,3-sialiltransferasa 1
Chi3l1	CHI3L1	Proteína 1 similar a la quitinasa 3
Chil3	CHIA	Quitinasa ácida

EXPERIMENTAL DESIGN

In silico

CU / Healthy



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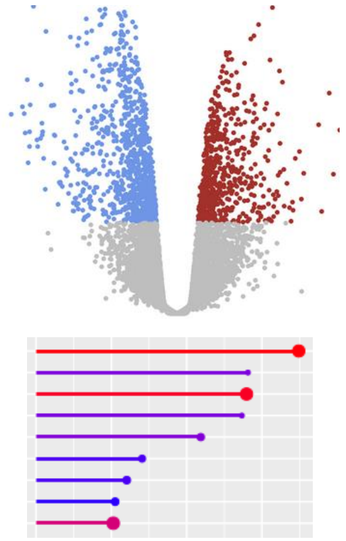
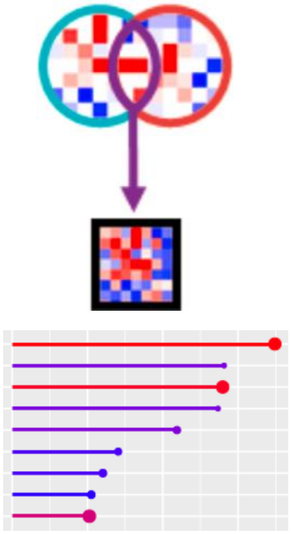


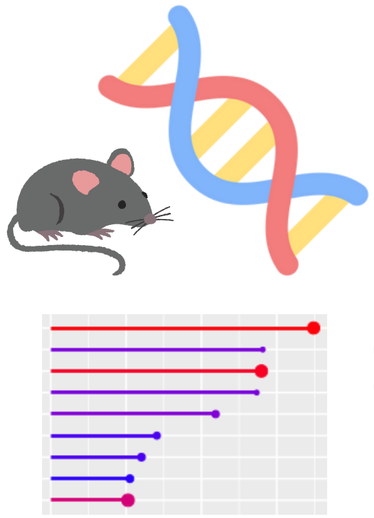
- Pancolitis (GSE47908)
- CU-I (GSE47908)

CCRAC / CU



- CCRAC / pancolitis (GSE3629)
- Pancolitis / CU-I (GSE47908)

Glycobiological signature



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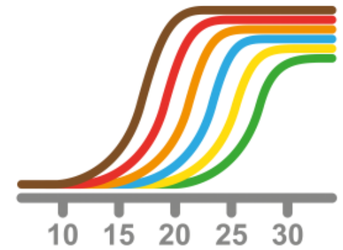
RT-qPCR



In vivo

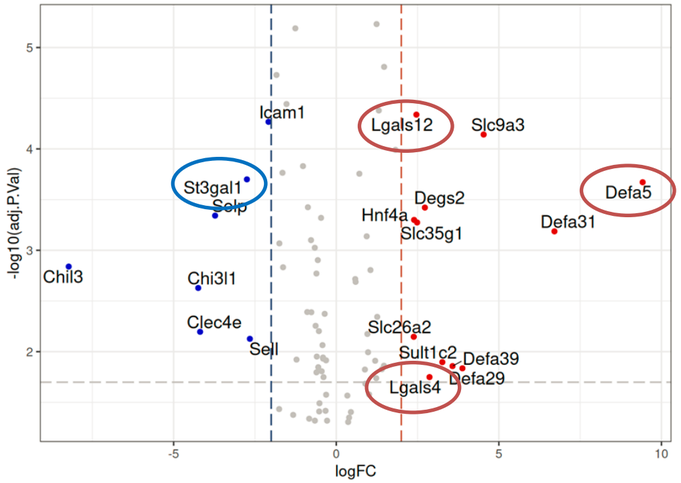
Patients

Murine models

QUANTITATIVE RT-PCR

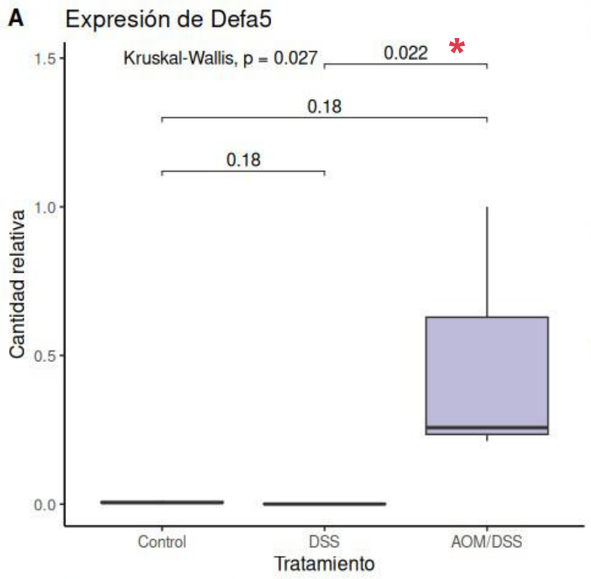
C57Bl/6

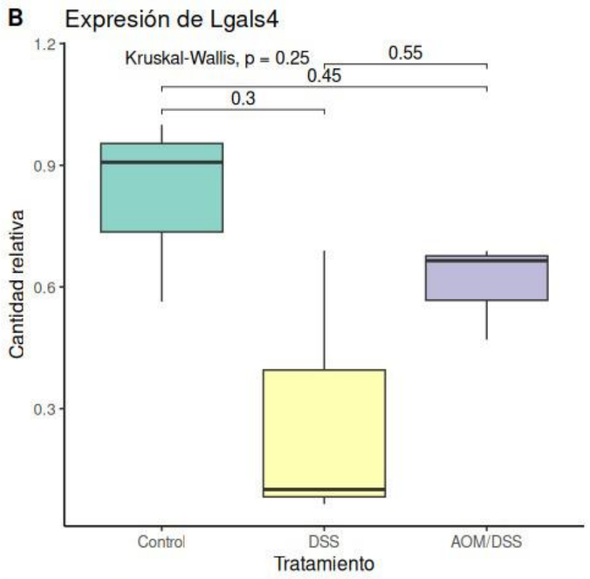
1. Control: No treatment
2. Acute Colitis: DSS
3. CCRAC: AOM-DSS

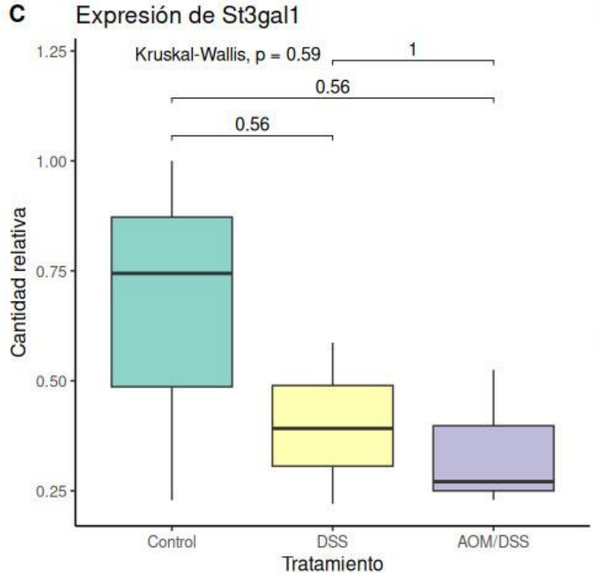


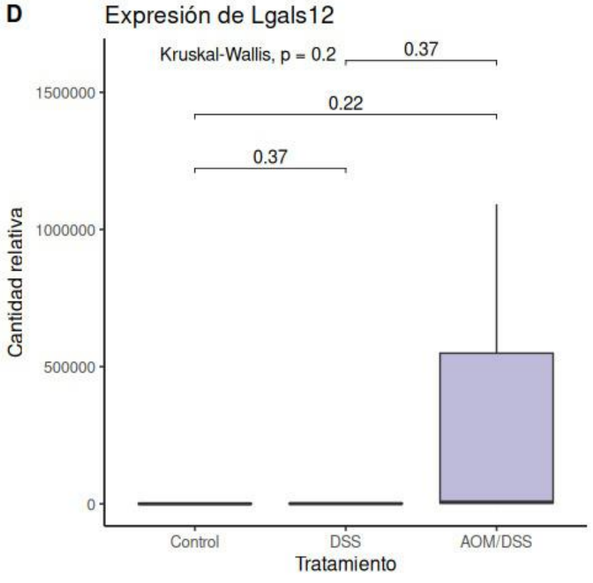
Dr. Mora Massaro (DSS Intestinal Inflammation Model)

Dr. Alejandro Cagnoni (Model CCRAC by AOM-DSS)





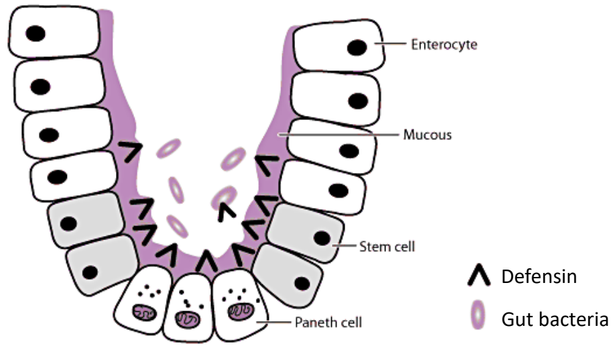


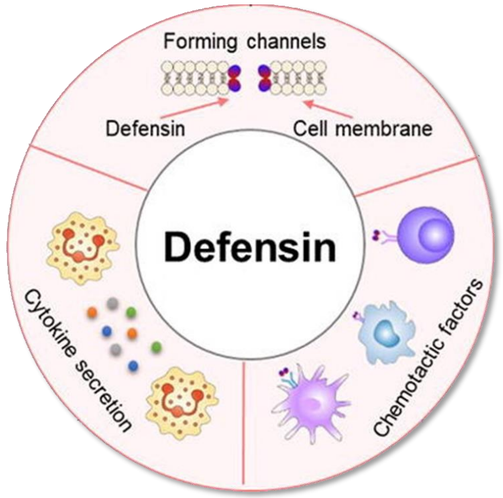


Results

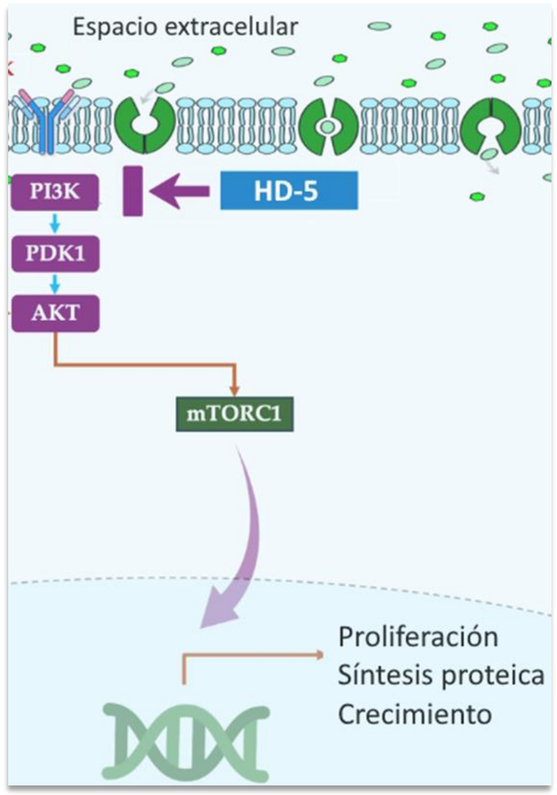
CONCLUSIONS AND DISCUSSION

DEFA5



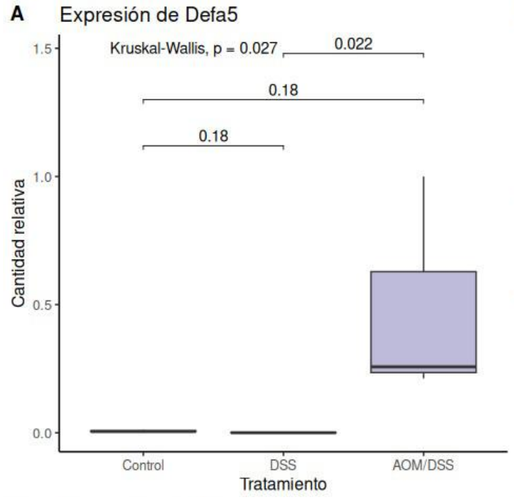


Gao et al (2021). Defensins: The natural peptide antibiotic. Doi: 10.1016/j.addr.2021.114008



Qiao et al (2021). Human α-defensin 5 suppressed colon cancer growth by targeting PI3K pathway. Doi: 10.1016/j.yexcr.2021.112809

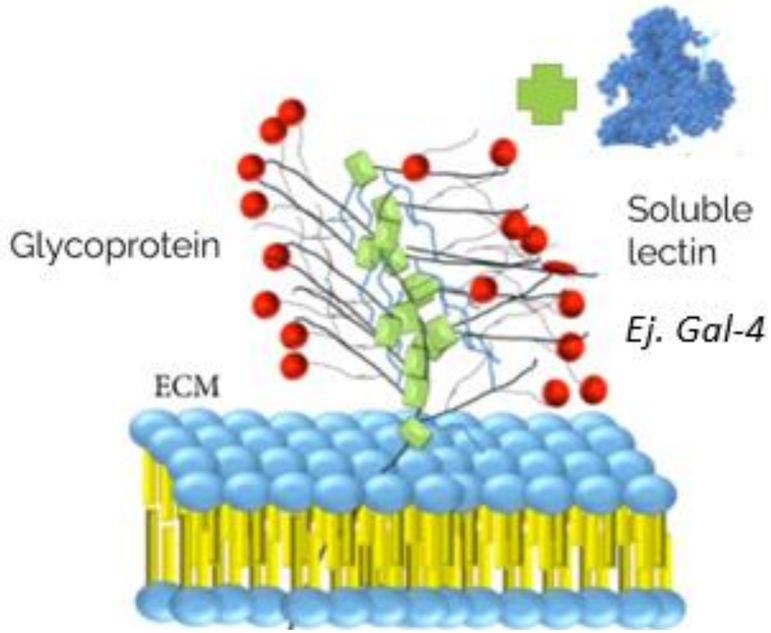
- Not expressed in healthy tissue
- ↑ in UC, proposed as a biomarker vs CD
- ↑ in CRC: associated with tumor suppression (blocking the PI3K pathway) and longer survival
- There are no studies in CCRAC



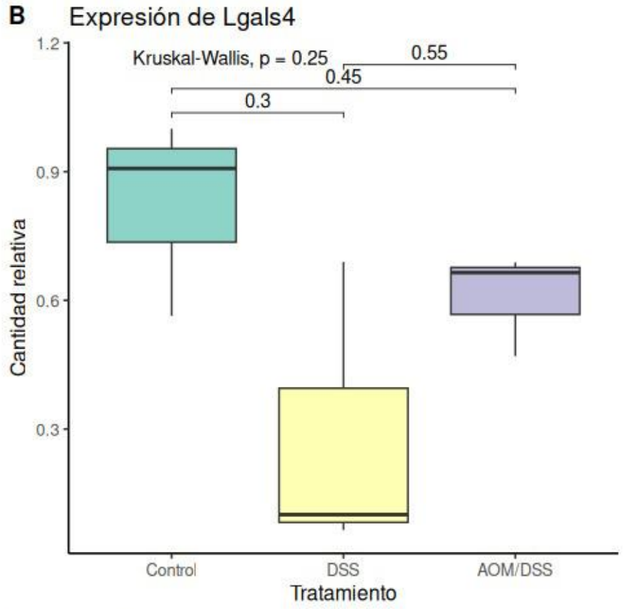
Conclusions and discussion

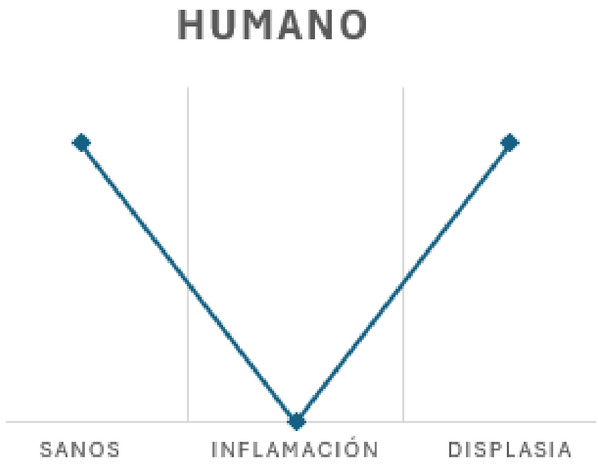
LGALS4

Galectins: Glycan-binding proteins with various roles; Therapeutic targets in neoplasia



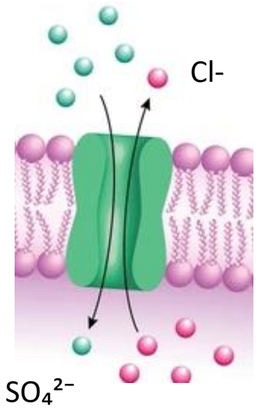
- Affects memory CD4+ T expansion
- **↓ in CRC tumors vs. healthy tissue**

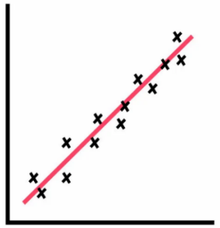


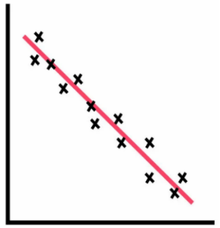


Conclusions and discussion

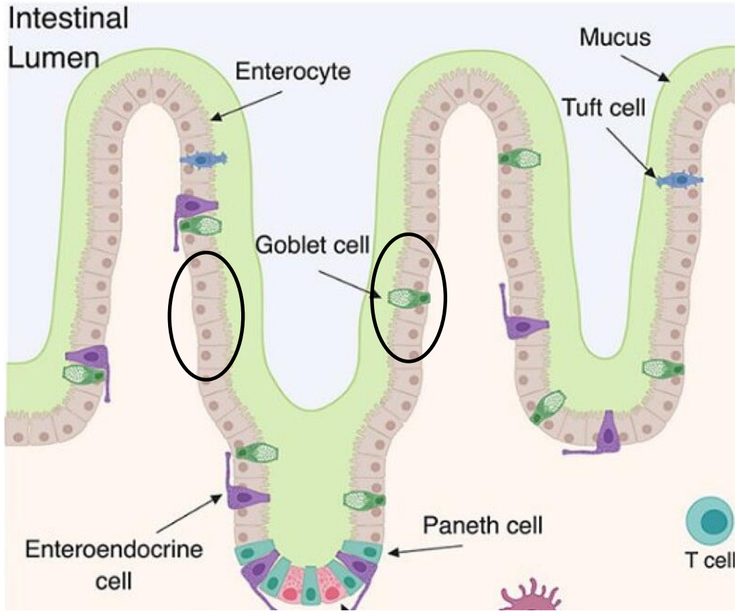
SLC26A2

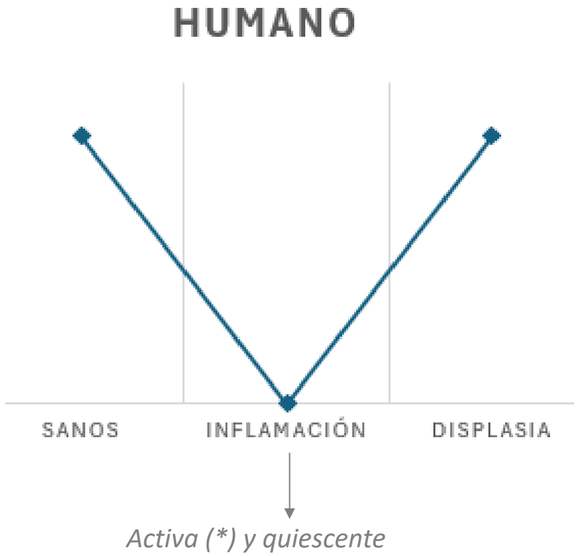



Uniones estrechas


IL-17

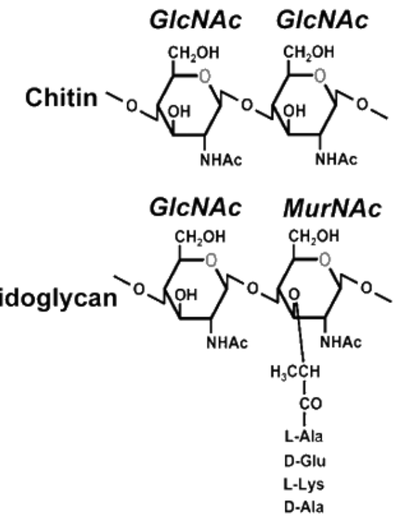
- ↓ on active UC and DSS models.
- Regulates mucins
- **↓ in cancer: worse prognosis, greater proliferation**



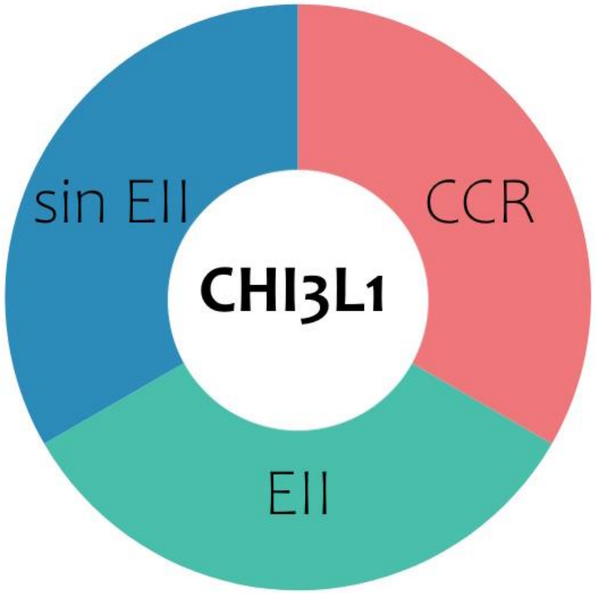


Conclusions and discussion

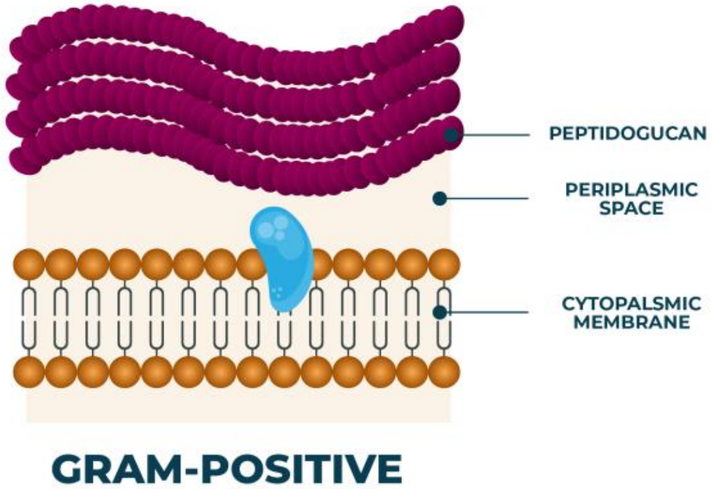
CHI3L1



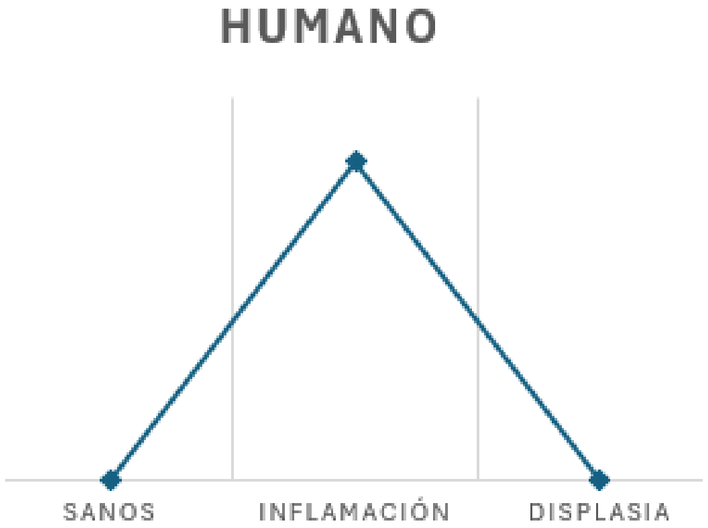
Anchoring commensal bacteria



- **↑ in serum (secreted by tumors)**
- **Promotes neoplastic development: Wnt/β-catenin**



- ↑ in serum (CU)
- Expression associated with immune cells
- Chronic inflammation: Wnt/β-catenin
- ↓ Chi3l1 = ↑ DSS-induced colitis



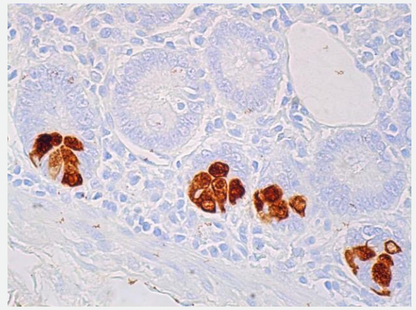
Conclusions and discussion

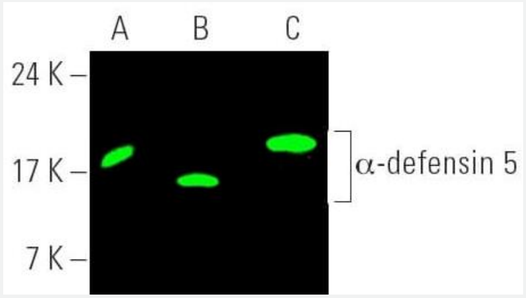
APORTES Y PERSPECTIVAS FUTURAS

1 A CCRAC/CU signature of 10 potentially dysregulated glycogenes was delineated, four of which (*Defa5*, *Lgals4*, *Lgals12*, *and St3gal1*) were analyzed by RT-qPCR, with significant results for ***Defa5***.

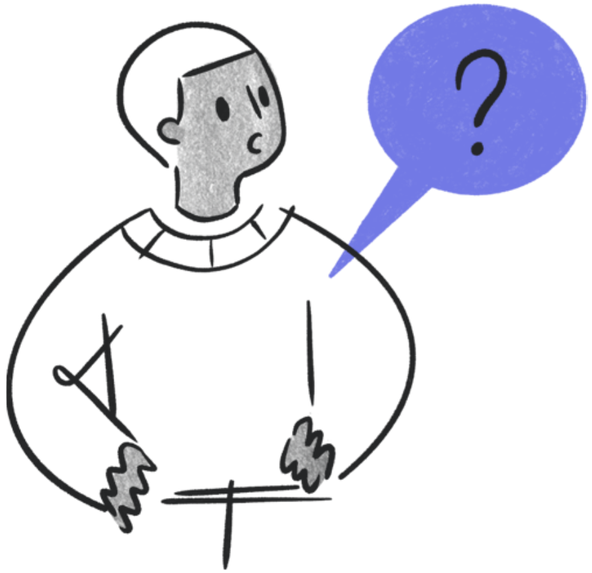
2 The glycobiological signature will be validated in a local cohort of patients, and through the use of single-cell technologies, the cellular origin of the dysregulation will be sought.

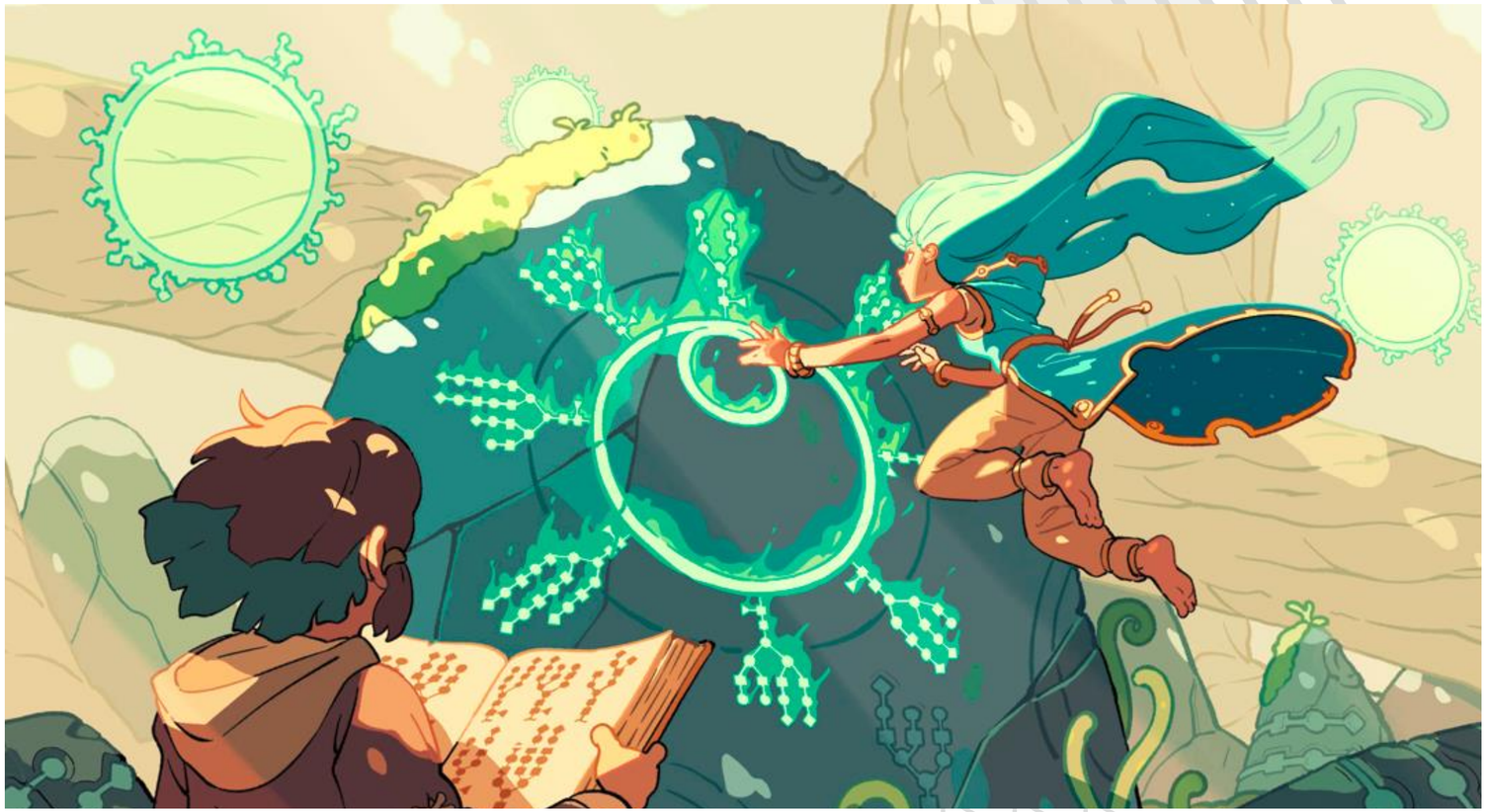
3 In the future, different methods of detecting DEFA5 expression that can be transferred to the clinic could be used. E.g. Western blot, and immunohistochemistry.





THANK YOU VERY MUCH!





QUESTIONS?

UADE

CONICET

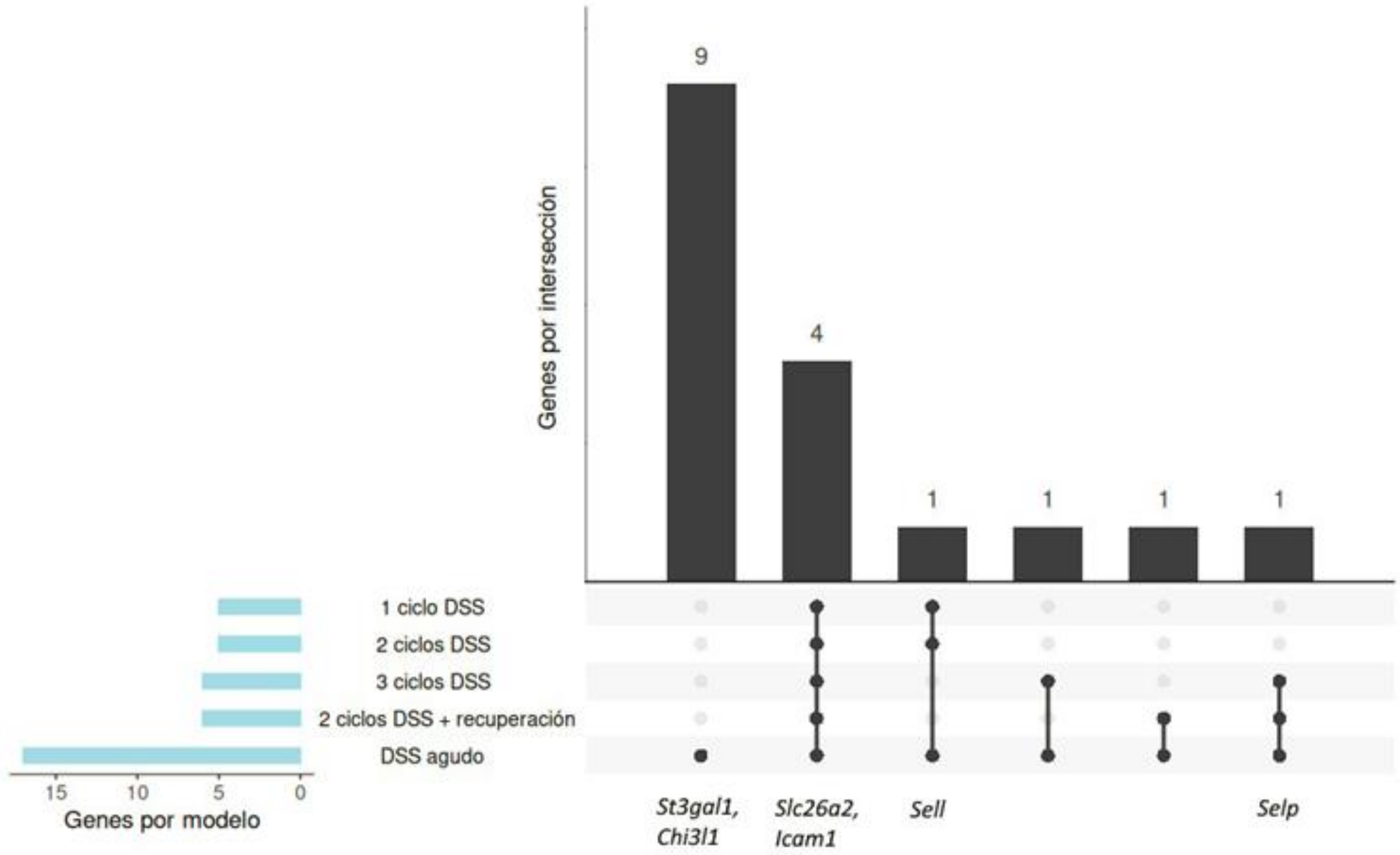
FIBYME Fundada en 1944 Dr. Bernardo A. Houssay

IBYME

ADVANTAGES OF THE MURINE MODEL

Advantages	DSS / AOM-DSS Model	Similarity/usefulness in humans
Implementation	Easy, reliable, adaptable (dose/times)	Allows the study of acute, chronic or recurrent colitis
Initial mechanism	Epithelial damage → ingress of bacteria/antigens → inflammation	~ barrier dysfunction in IBD
Immune response	Acute phase: innate immunity (macrophages, neutrophils, TLR, TH1 cytokines: TNF-α, IFN-γ, IL-1β, IL-12)	Reflects early immune mechanisms in IBD
Chronic colitis	Requires prolonged/cyclic DSS → TH2 cytokines (IL-4, IL-6, IL-10)	Reproduces changes in chronic human inflammation
Clinical manifestations	Diarrhea, weight loss, blood in the stool, anemia (acute phase)	Recapitulates various symptoms and clinical variability of IBD
Histopathology	Epithelial damage, ↓ mucins, neutrophilic infiltrate, crypt disorder...	Very similar to findings in human IBD
AOM-DSS Model	Tumors from 10 weeks, distal tumors, invasive adenocarcinomas	Reproduces key facets of human CACRC
Research Application	Useful for studying signalling (TLR4, IKKβ, IL-6), influence of microbiota	Key to understanding the pathogenesis of CACRC

ACUTE OR CHRONIC?

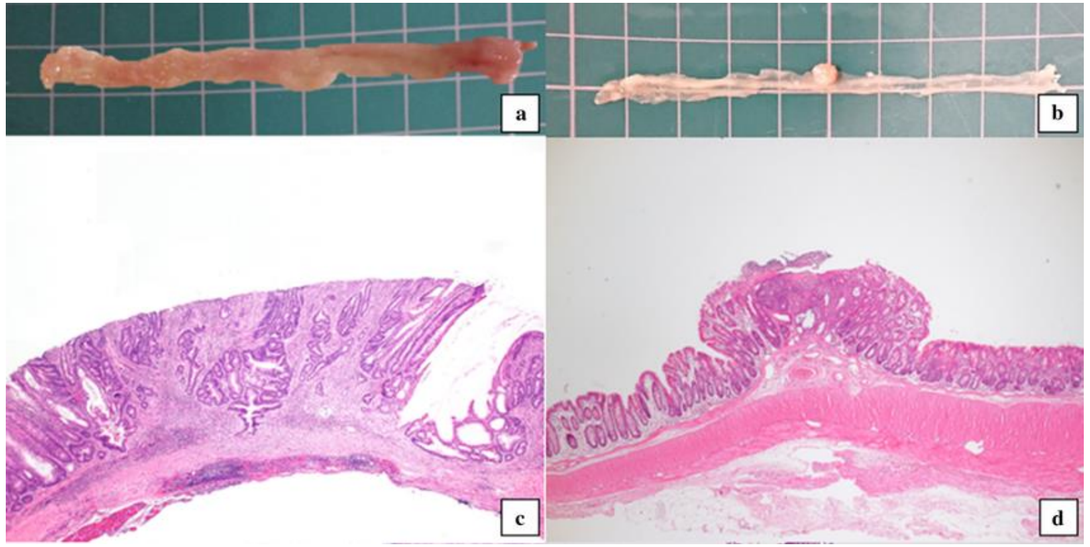


Questions & Answers

LIMITATIONS OF THE MURINE MODEL

Limitations	CACRC	AOM/DSS
Injuries	Flat, invisible, require dyes	Raised polyps
Common mutations	TP53	APC (~ CCRE)
Carcinogenesis Time	Years	Weeks
Progression mechanism	Field cancerization: progressive accumulation, multifocal lesions	"Big Bang": Simultaneous Multiple Mutations, Rapid Clonal Expansion

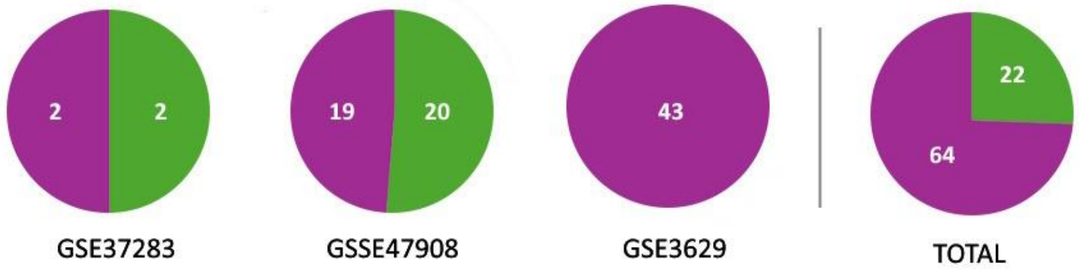
CD4-dnTGFβRII/AOM) **AOM/DSS**



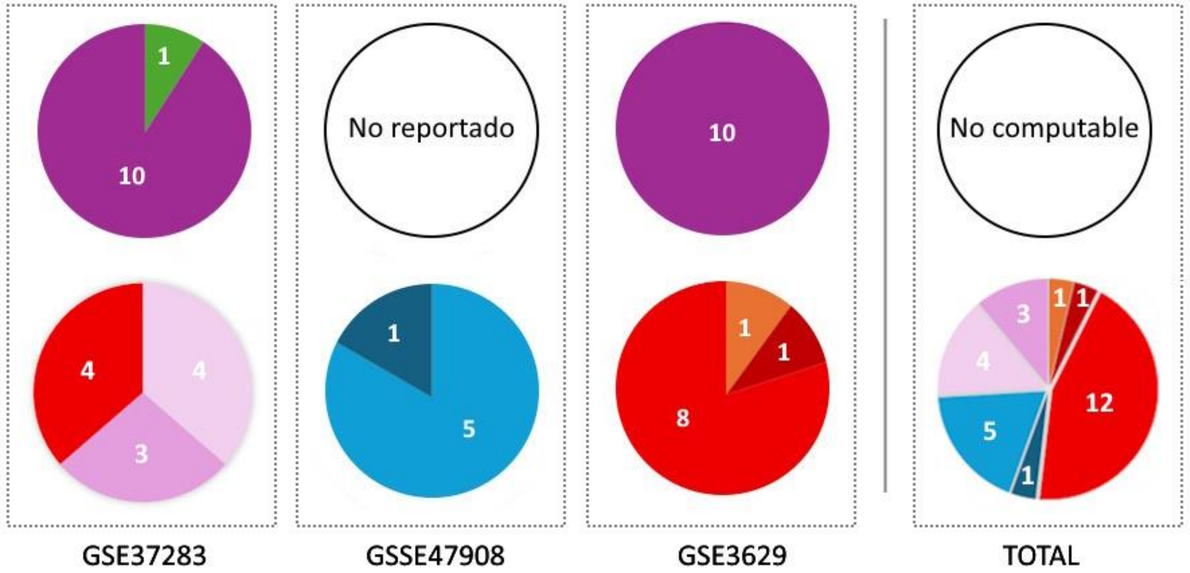
Hisamatsu, et al. Inflammation-Associated Carcinogenesis in Inflammatory Bowel Disease: Clinical Features and Molecular Mechanisms. *Cells* **2025**, *14*, 567.

PATIENT COMPOSITION

Pacientes con EII únicamente



Pacientes con EII + displasia o cáncer

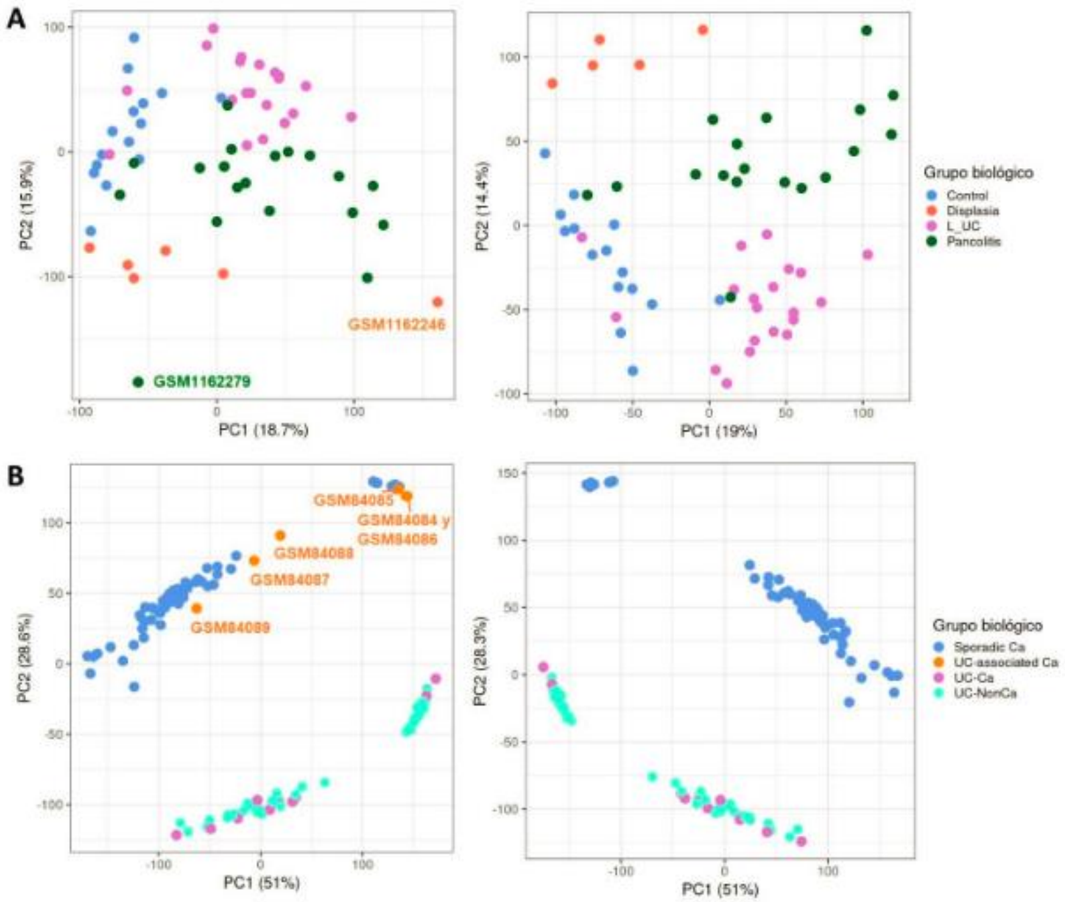


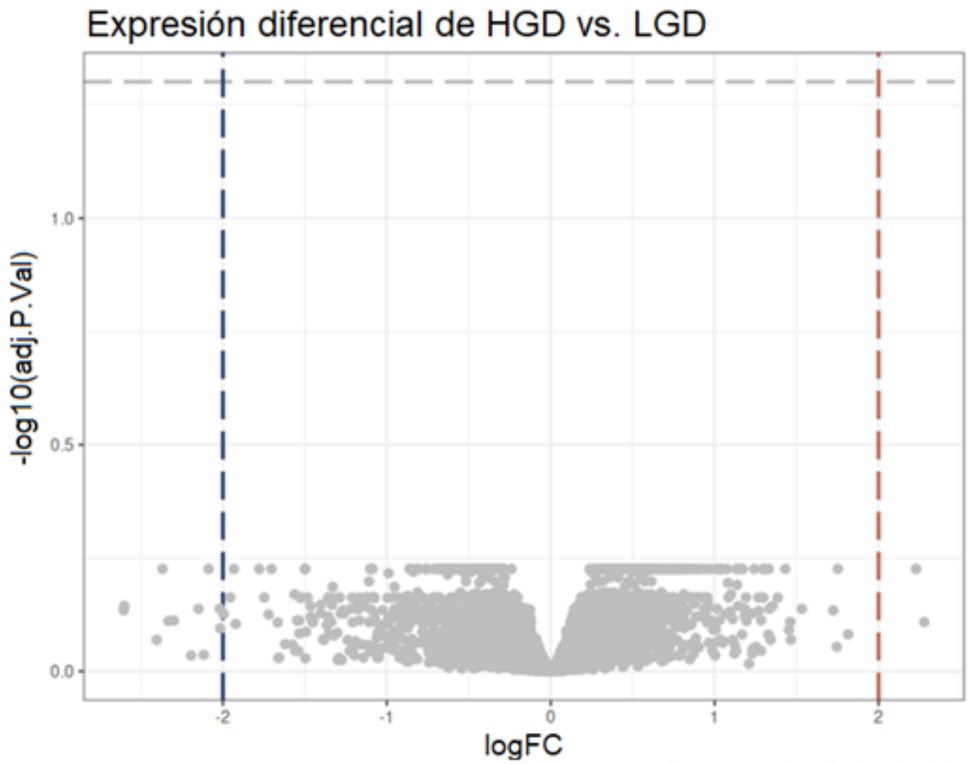
Referencias

- Pancolitis (E3)
- CU Izquierda (E2)
- LGD
- HGD
- CU + LGD
- CU + HGD
- CU + CCRAC + LGD
- CU + CCRAC + HGD
- CU + CCRAC

Questions & Answers

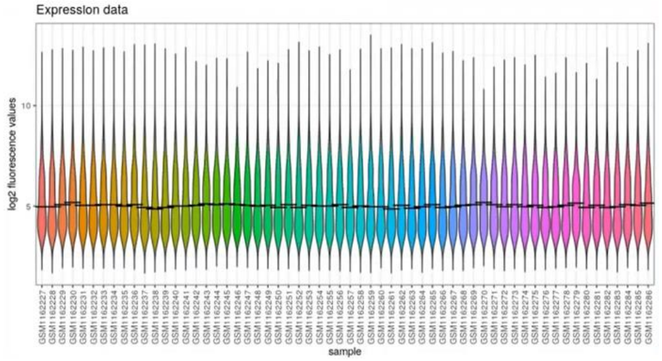
QUALITY CONTROL

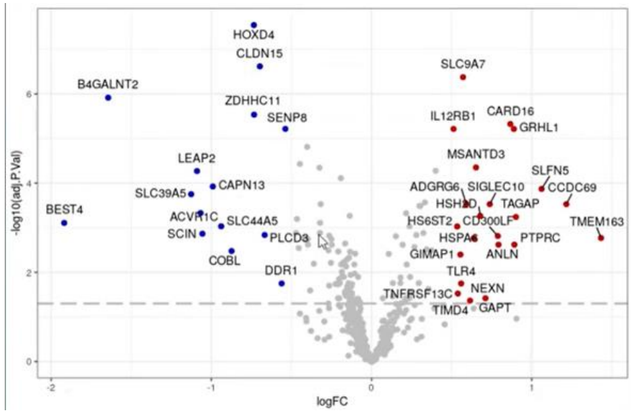


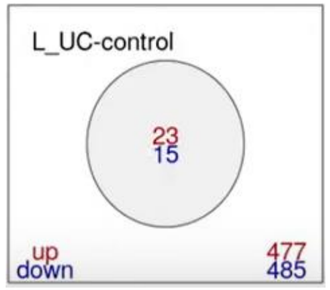


Questions & Answers

DEGFIND





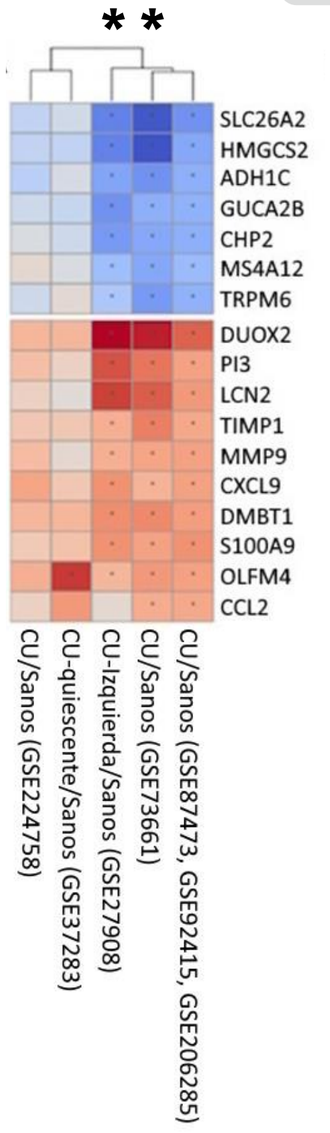


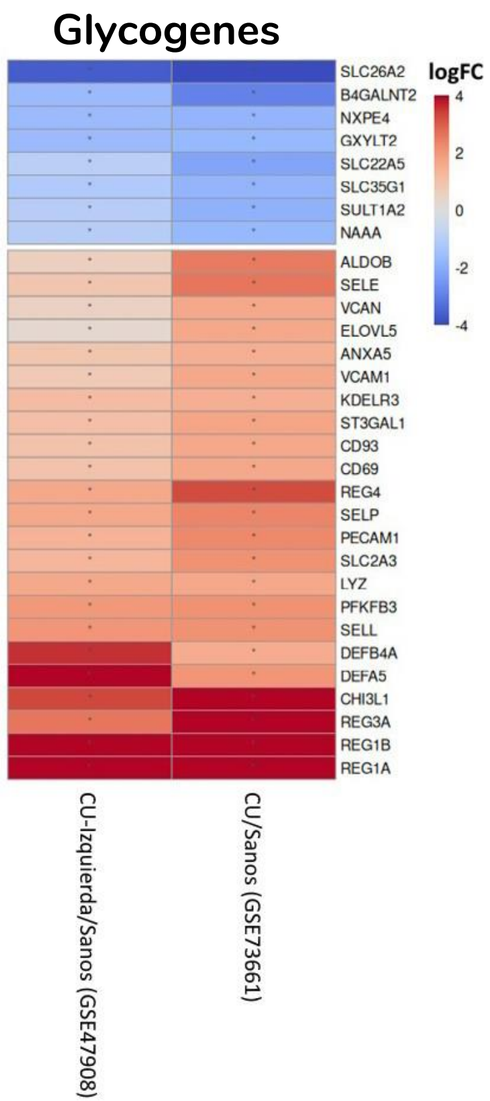

```
> topTable(fit, coef=2, n=40, adjust="BH")
                              ID logFC AveExpr     t P.Value adj.P.Val      B
4282  IG_821_1300838_1300922_fwd_st -3.32    12.4 -23.1 7.2e-09   5.3e-05  8.017
5365                  serA_b2913_st  2.78    12.2  15.8 1.6e-07   6.0e-04  6.603
1389                  gltD_b3213_st  3.03    10.9  13.3 6.4e-07   1.6e-03  5.779
4625                   lrp_b0889_st  2.30     9.3  11.4 2.3e-06   4.0e-03  4.911
```

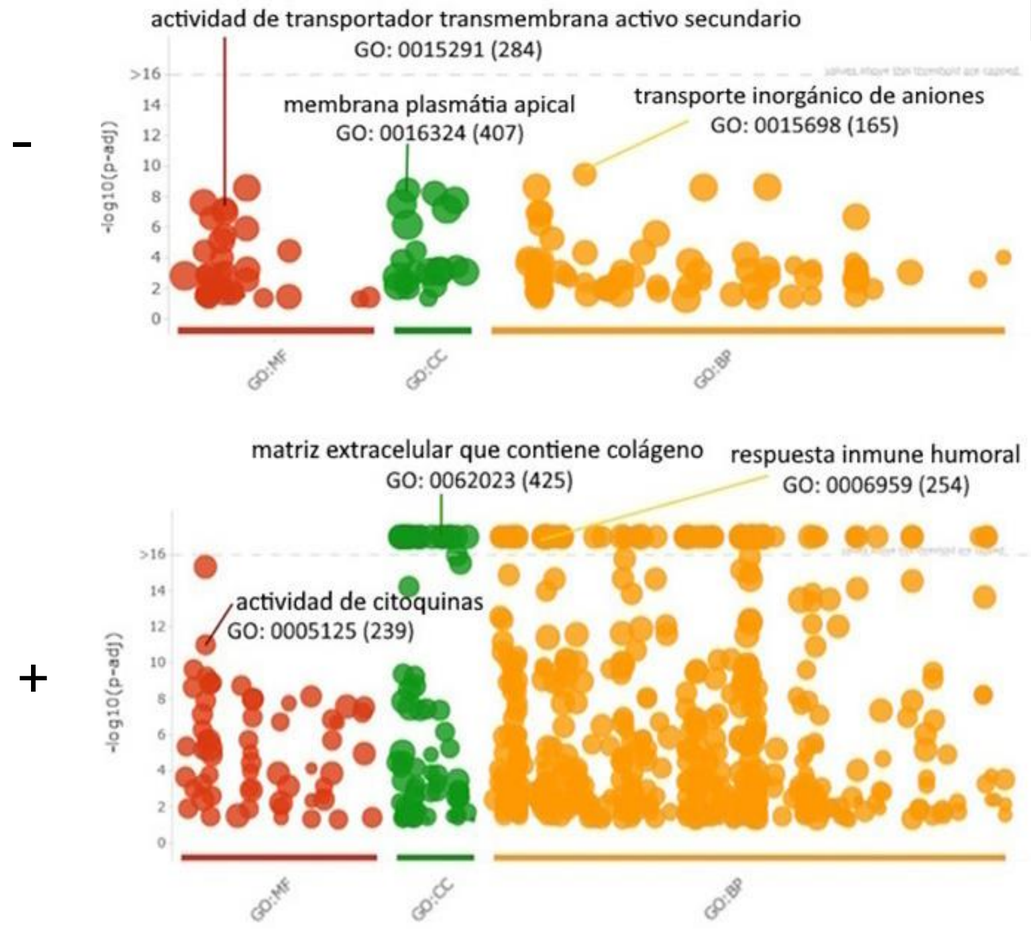
Degfind
R package with 8 functions for differential expression analysis in bulk (RNA-seq and microarrays).
DEG_table: Generates differential expression table.
SDRs: Extracts names from significant SDRs, and generates a Venn diagram with the positively and negatively regulated ones.
gene_names: Extracts gene names from SDR table.
make_lm: Processes expression data to generate a linear model returns Bayesian results and statistics.
make_toptable: Processes Bayesian statistics from a linear model to generate a data frame, and classifies low- and high-expression genes.
plot_data_quality: Generates and saves a violin plot to describe the quality of the expression data.
sample_names: Extracts names from the samples in the table.
volcano: Generates and saves a volcano plot with differential expression data, where the x-axis is the logFC and the y-axis is the p-adjusted value.

Questions & Answers

UC/HEALTHY







Questions & Answers

IBYME MURINE MODEL

- C57Bl/6
- 8-12 weeks
- frozen in trizol
- 3 gut samples

Control: untreated, frozen in September 2023. Galectin-4 flanked with a Loxp region, but its phenotype was wild (VillinCrewt/wtLgals4 flox/phlox)

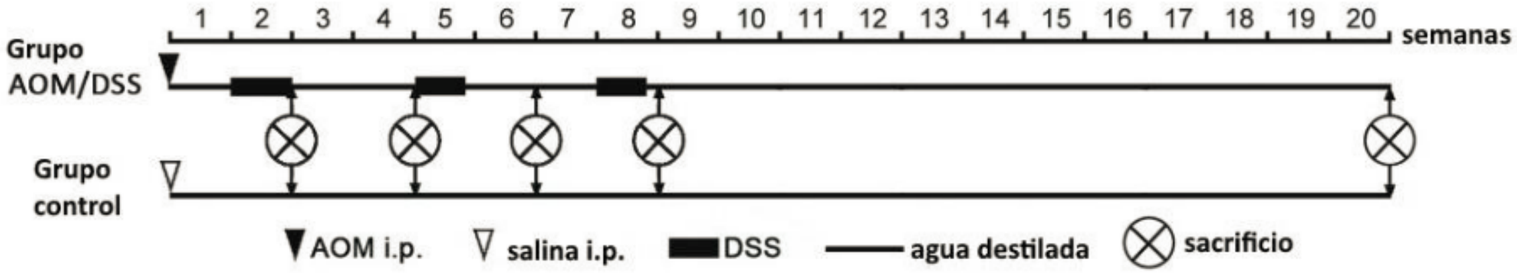
Acute Colitis (DSS): VillinCrewt/wtLgals4flox/phlox treated with DSS 3% in drinking water for 5 days and then 5 days regular water. The total duration of the experiment was 10 days. The gut samples, inflamed or not, were frozen in February 2023.

CACRC (azoxymethane/DSS): intraperitoneal injection of azoxymethane (AOM, 12.5 mg/kg); then DSS (2.5%) 5 days later in drinking water for 5 days, followed by 14 days of rest with regular water (x3 = 12 weeks). The tumor samples were frozen in January 2024.

Questions & Answers

MURINE MODEL ANALYZED IN SILICO

ICR ♂



Control: intraperitoneal injection of saline solution (10 mg/kg) on day 1, they drank distilled water. Sacrifice on the 14th.

Acute inflammation (AOM-DSS): week 2 (day 14). Intraperitoneal injection of AOM (10 mg/kg) on day 1, followed by three cycles of DSS administration (cycle 1: 2%, days 8~14) in drinking water.

CCRAC (AOM-DSS): Week 20 (day 140).. Intraperitoneal injection of AOM (10 mg/kg) on day 1, followed by three cycles of DSS administration (cycle 1: 2%, days 8~14; cycle 2: 1.5%, days 29~33; cycle 3: 1.5%, days 50~54) in drinking water.

Questions & Answers

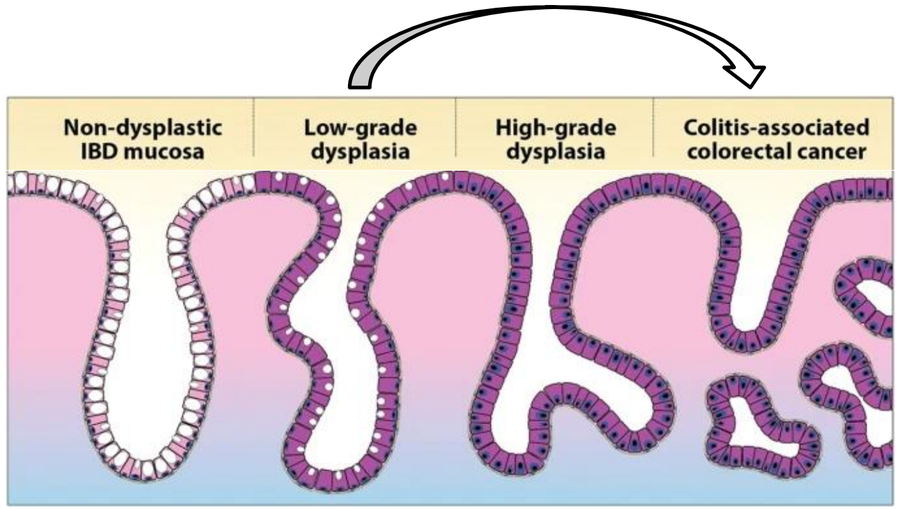
RT-QPCR

Gen	Nombre	Sentido	Secuencia
B2m	Beta-2-Microglobulina	FWD	ACCGTCTACTGGGATCGAGA
		REV	TGCTATTTCTTTCTGCGTGCAT
Defa5	Defensina Alfa 5	FWD	TTGTCCTCCTCTCTGCCCTTGT
		REV	ATGAAGAGCAGACCCTTCTTG G
Lgals4	Galectina-4	FWD	ATGGTCACCCATCTGCAAGT
		REV	AAGCTGGAATAGTCATGGCTCC
Lgals12	Galectina-12	FWD	AACTGACGAACACCTGGACC
		REV	TGCCATAAGGAATCACCGGG
St3gal1	ST3 beta-galactósido alfa-2,3-sialiltransferasa 1	FWD	TCCTACAACTGCACACGCTCG
		REV	TGTTTCGCCTGGTGCCTGG

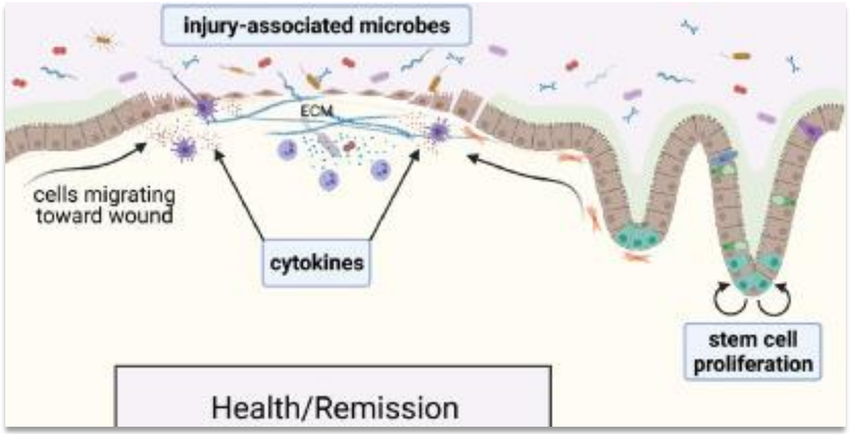
Gen	Efficiency (90-110)	Date
B2m	101.9	20/2
Defa5	121.1	20/2
Lgals12	-100	20/2
Lgals4	76.2	27/2
St3gal1	90.3	27/2

Questions & Answers

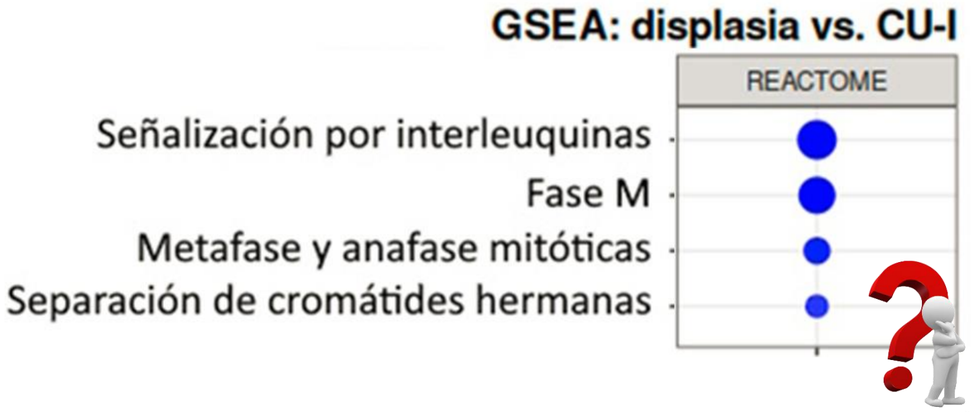
EXTENT OF INFLAMMATION AND DYSPLASIA



Zhou et al (2023). Molecular mechanisms in colitis-associated colorectal cancer. Doi: 10.1038/s41389-023-00492-0

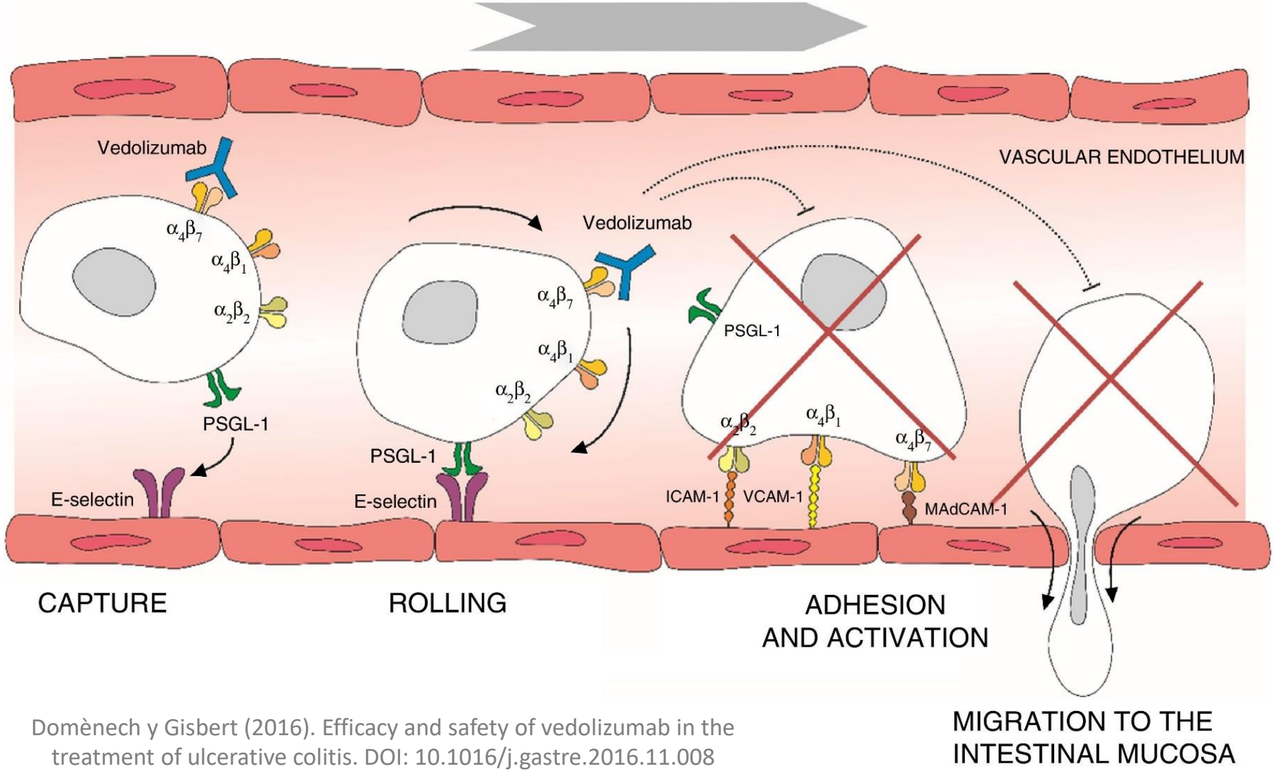


Liu et al (2021). Epithelial wound healing in inflammatory bowel diseases: the next therapeutic frontier. Doi: 10.1016/j.trsl.2021.06.001

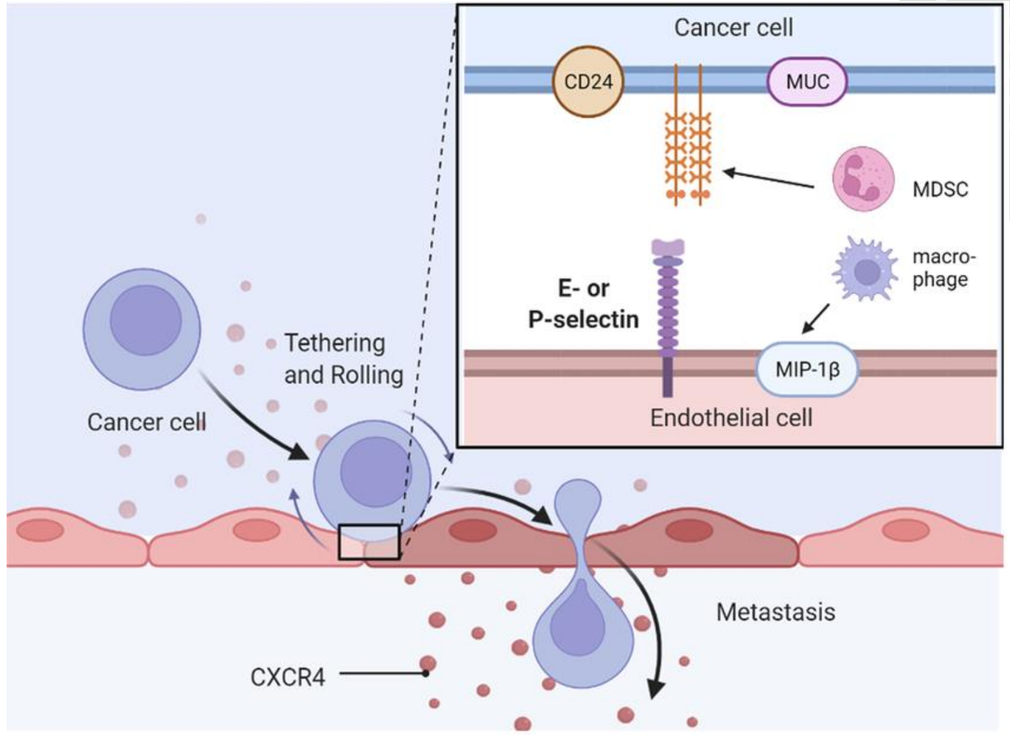


Questions & Answers

ADHESION MOLECULES: SELL, SELP, AND ICAM1



Domènech y Gisbert (2016). Efficacy and safety of vedolizumab in the treatment of ulcerative colitis. DOI: 10.1016/j.gastre.2016.11.008



Mechanisms of Cell Adhesion Molecules in Endocrine-Related Cancers: A Concise Outlook. Doi: 10.3389/fendo.2022.865436.

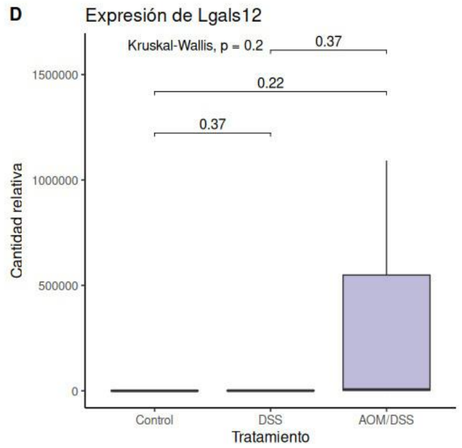
L-: leukocytes; P-: platelets and endothelial cells

ICAM1: immunoglobulin. Dual role in cancer: — secreted: worse prognosis; membrane: reduced tumor growth, increased survival (infiltration and cytotoxicity of antitumor CD8+ T cells)

Questions & Answers

LGALS12, CHIA/CHIL3

Galectins: Glycan-binding proteins with various roles; Therapeutic targets in neoplasia



Lgals12:

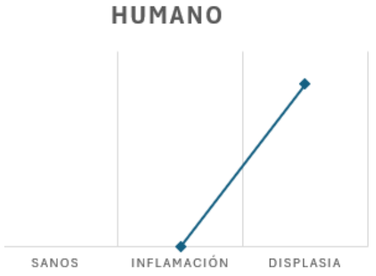
Possible role in inflammation (desensitized TNBS-induced colitis Gal12KO models)

Possible role in cell cycle control

Silenced in CRC cell lines, with tumor suppression

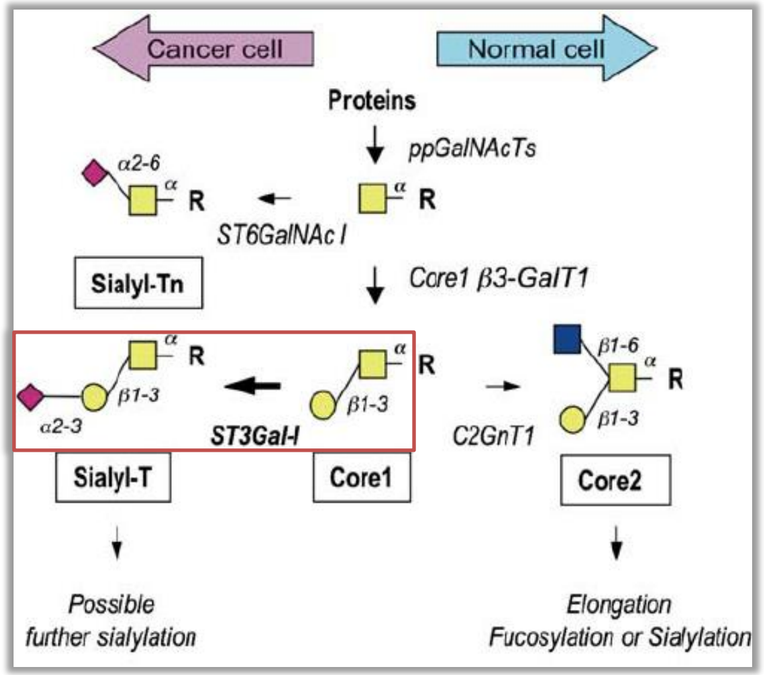
CHIA/Chil3: mammalian acid chitinase (AMCase).

Pro-inflammatory: OAT-177 (selective inhibitor) in a model with DSS lowers inflammation



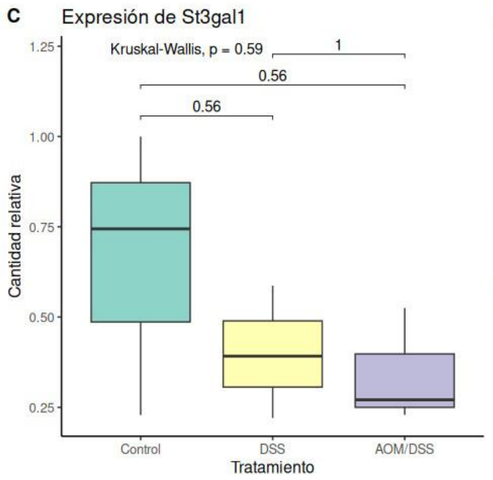
Questions & Answers

ST3GAL1



GalNAc N-acetylgalactosamine
Gal Galactose
Neu5Ac N-acetylneuraminic acid (sialic acid)
GlcNAc N-acetylglucosamine

Gianfranco et al (2010). Over-expression of ST3Gal-I promotes mammary tumorigenesis *Open Access. Doi:* 10.1093/glycob/cwq085



Amplificación inespecífica

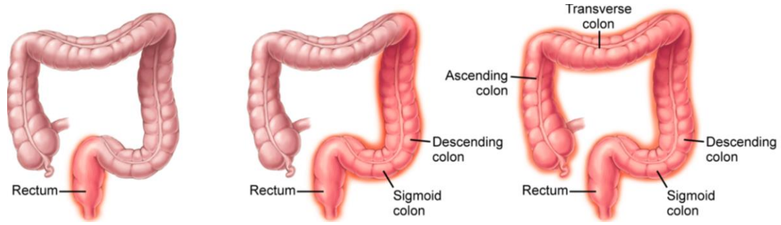
- Siallyl transferase: adds sialic acid, by means of a α(2,3) bond to galactose bound to N-acetylgalactosamine, which in turn is bound to serine or threonine in a protein (core O-type 1). This blocks the elongation of the chain.
- ↑ in cancer (CRC), where it promotes tumor invasion and metastasis, via the EGFR/NRP1 pathway

Questions & Answers

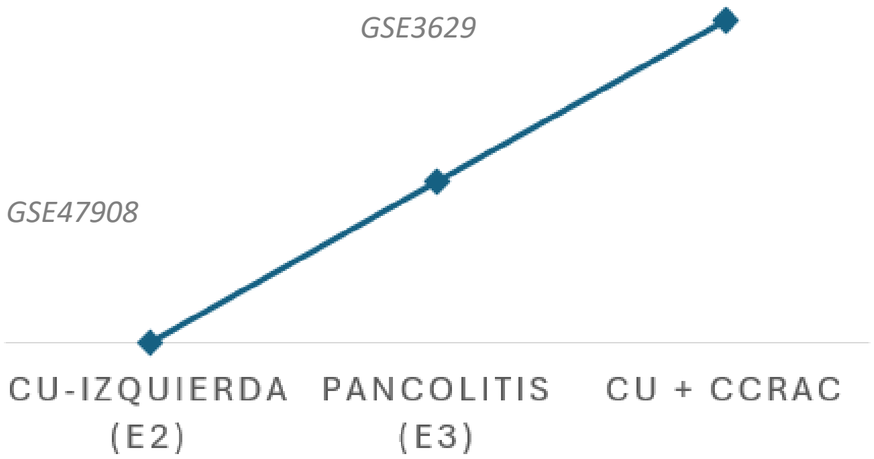
UC AND CACRC / LEFT UC

CU-Left (E2) Pancolitis (E3) CU+ CCRAC

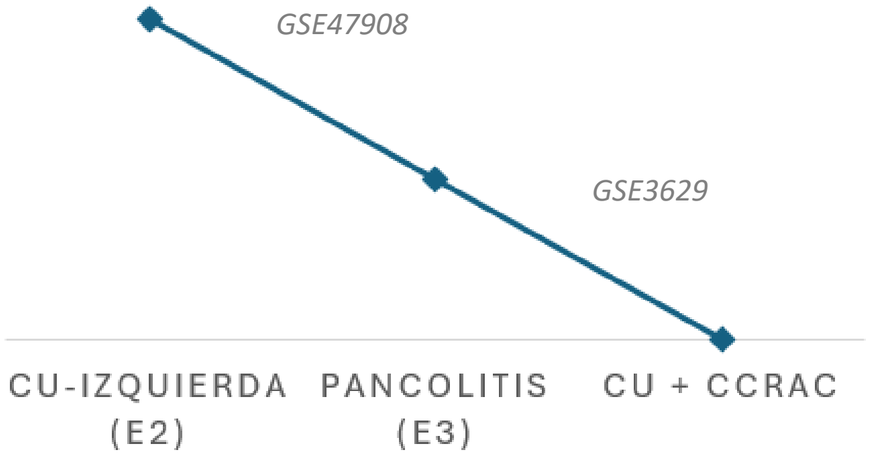
Cumulative Inflammatory Burden (CIM)



↑CU+CCRAC / CU-I



↓ CU+CCRAC / CU-I



Questions & Answers