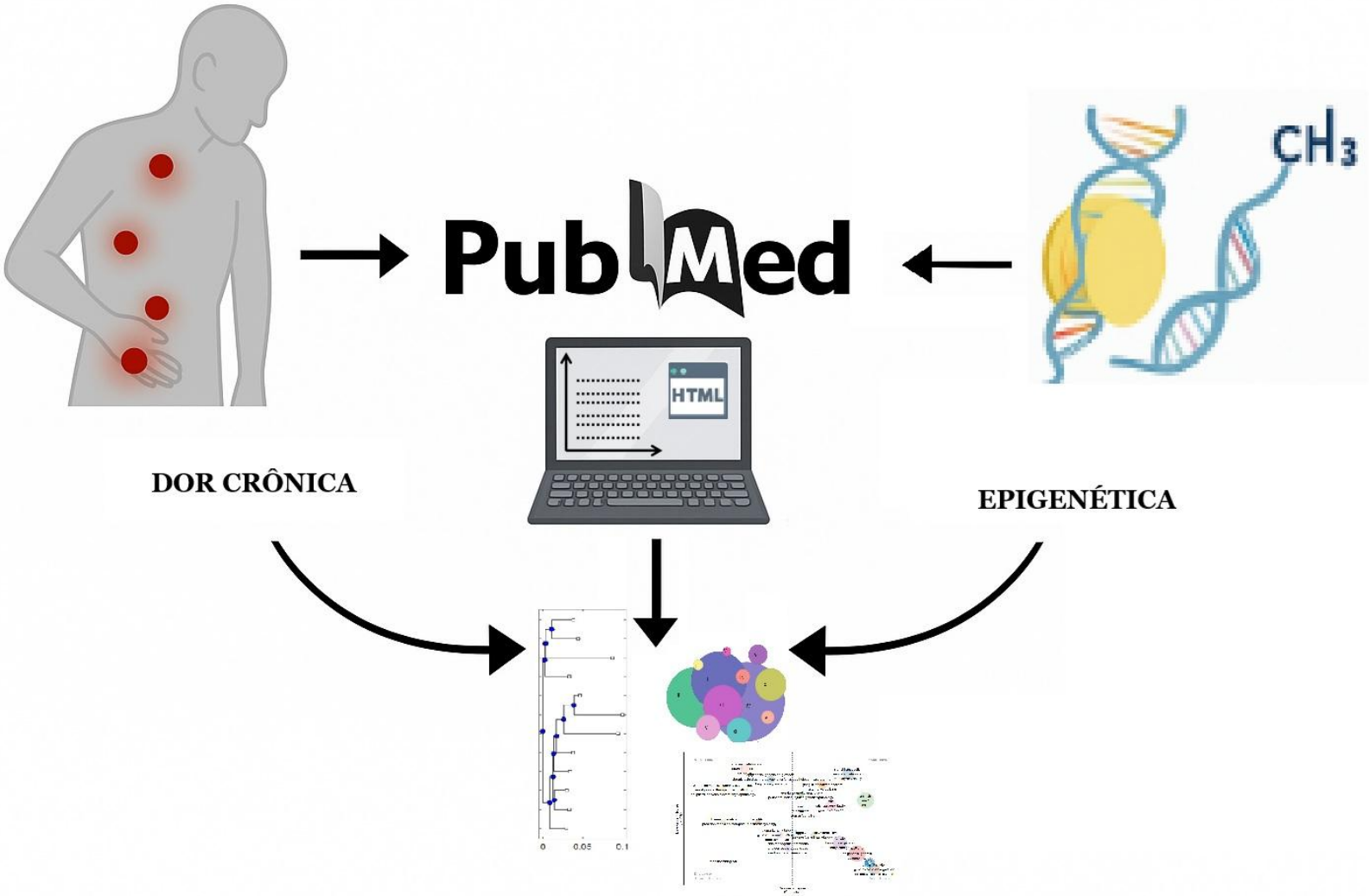
SWEEP E MINERAÇÃO DE TEXTO PARA ESTUDO DA EPIGENÉTICA NA DOR CRÔNICA

Discente: Maristela Palu Yamashita
Orientador: Professor Doutor Roberto Tadeu Raittz
Coorientadora: Doutora Camilla R. De Pierri

Programa de Pós-graduação em
Bioinformática
UNIVERSIDADE FEDERAL DO PARANÁ

INTRODUÇÃO



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INTRODUÇÃO

Teorias da dor

- Platão 428-347 a.C.
  – Teoria da intensidade;
- René Descartes 1596-1965
  – Teoria Dualista Cartesiana;
- (1700-1900)
  – Teoria da Especificidade X Padrão
- Patrick David Wall (1925-2001)
  e Ronald Melzack (1929-2019)
  – Teoria do Portão/Modelo Neuromatrix
- Dr. John D. Loeser (anos 2000)
  – Modelo Biopsicossocial

Fonte: Adaptado de (NIRVANIE-PERSAUD; MILLIS, 2022)

INTRODUÇÃO

IASP (Associação Internacional para Estudos da Dor)

"uma experiência sensitiva e emocional desagradável, associada, ou semelhante àquela associada, a uma lesão tecidual real ou potencial" (DESANTANA et al., 2020).

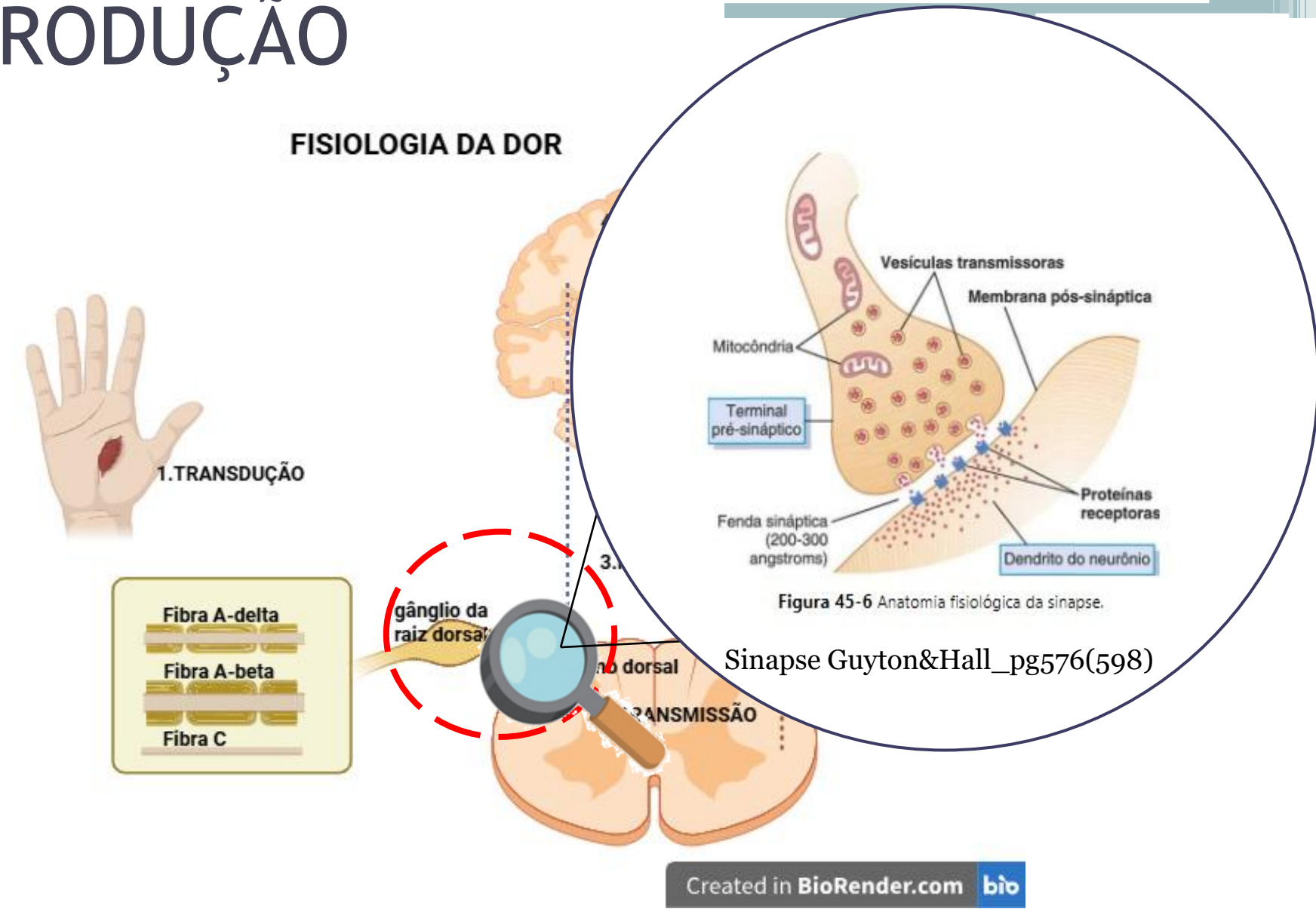
Definição revisada de dor pela Associação Internacional para o Estudo da Dor: conceitos, desafios e compromissos

Autores da Força Tarefa da Associação Internacional para o Estudo da Dor (IASP): Srinivasa N. Raja[a,*], Daniel B. Carr[b], Milton Cohen[c], Nanna B. Finnerup[d,e], Herta Flor[f], Stephen Gibson[g], Francis J. Keefe[h], Jeffrey S. Mogil[i], Matthias Ringkamp[j], Kathleen A. Sluka[k], Xue-Jun Song[l], Bonnie Stevens[m], Mark D. Sullivan[n], Perri R. Tutelman[o], Takahiro Ushida[p], Kyle Vader[q]

Tradução para a língua portuguesa da definição revisada de dor pela Sociedade Brasileira para o Estudo da Dor

Autores da tradução: Diretoria da Sociedade Brasileira para o Estudo da Dor - Gestão 2020-2021 (Josimari Melo DeSantana[1], Dirce Maria Navas Perissinotti[2], José Oswaldo de Oliveira Junior[3], Luci Mara França Correia[4], Célia Maria de Oliveira[5], Paulo Renato Barreiros da Fonseca[6]).

INTRODUÇÃO



Sinapse Guyton&Hall_pg576(598)

Fonte: Os autores (2025)

INTRODUÇÃO

DOR AGUDA X DOR CRÔNICA

DOR AGUDA

- Alertar dano eminente;[1291]
- Sobrevivência; [1291]
- Quinto sinal vital;

DOR CRÔNICA

- Persiste após retirada fator causal;
- Duração > 3 meses;
- Angustiante;
- ↑Risco comorbidades/Depressão;[2932,1686]
- ↓Qualidade de vida;[2932,1686]
- Doença;
- 40% da população adulta;

The link between epigenetics, pain sensitivity and chronic pain

Rocco Giordano ✉, Kristian Kjær-Staal Petersen and Lars Arendt-Nielsen

From the journal Scandinavian Journal of Pain
https://doi.org/10.1515/sjpain-2022-0086

INTRODUÇÃO

Justificativa/*Gaps*

- Faltam revisões integrativas;
- Foco em mecanismos isolados;
- Influência de fatores biopsicossociais pouco explorada;
- Elucidação incompleta do processo da transição da dor aguda para a crônica;
- A ausência de biomarcadores;
- Predomínio de estudos pré-clínicos;
- A limitação de opções farmacológicas;

INTRODUÇÃO

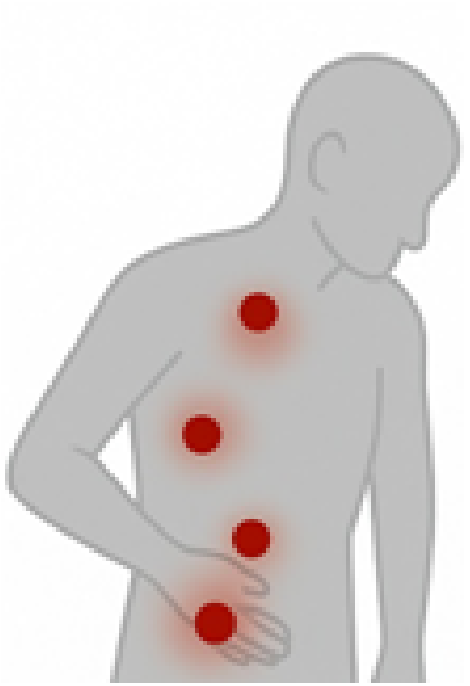
Objetivo Geral

Utilizar abordagens de tecnologia vetorial e de mineração de texto para explorar a literatura científica na temática de epigenética e da dor crônica.

INTRODUÇÃO

Questão norteadora

Como se dá o aprendizado da dor?



METODOLOGIA

Definição dos termos de busca para PubMed

String:
(*pain[Title/Abstract] or chronic[Title/Abstract]) AND (Epigenetic[Title/Abstract])*

7.186 *papers*

**Critéiros de Exclusão:*
Title ou *Abstract* sem preenchimento e *Abstract* com menos de 300 caracteres.

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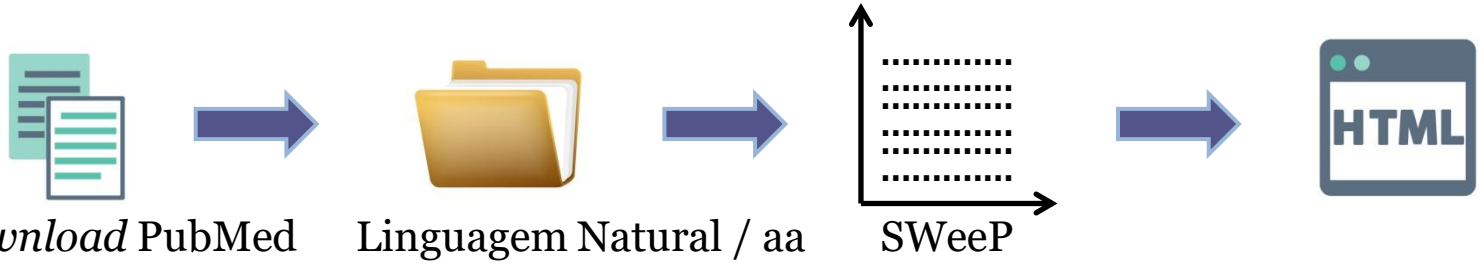
METODOLOGIA

Tratamento dos dados, vetorização e aplicação de abordagens TM



Download PubMed Linguagem Natural / aa SWeeP

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WORDS.html

A - WORDS.html (10 primeiros termos de 4.877)

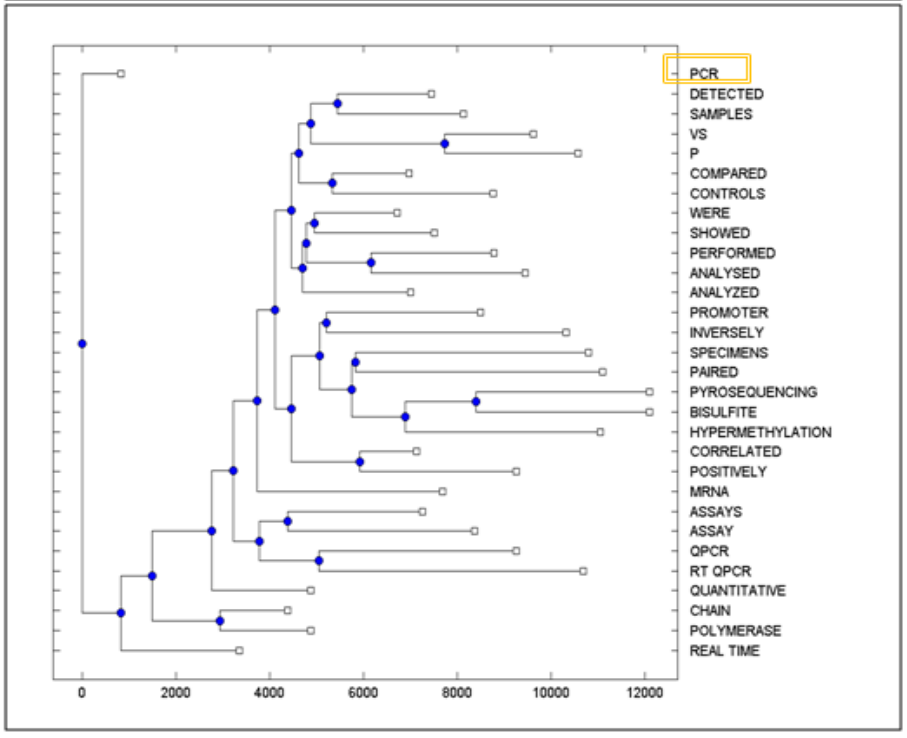
Cod	WORD	Related words	Link Title **B**	Link Abstracts **C**	Link Graphic
1	BIOTRANSFORMATION	indirect genotoxic toxicants radicals adducts chemical toxic chemicals xenobiotic	Abstracst	Tree	Year Usage
2	BIOTIC	multigenerational repetitive progeny mammals concentrations anion isogenic sativa a	Abstracst	Tree	Year Usage
3	BIOTIN	consumption ethanol mimics acinar incubation uptake exerted palmitate multivitamin	Abstracst	Tree	Year Usage
4	BIOLOGICAL	focused future individuals related among linked particularly multiple relevant	Abstracst	Tree	Year Usage
5	BIOLOGY	understanding insights future knowledge defining precise fundamental current perspective	Abstracst	Tree	Year Usage
6	PCR	q rt q controls detected assay quantitative chain polymerase real time	Abstracst	Tree	Year Usage
7	BIOAVAILABILITY	interventions prevent future dietary improve compounds attention reduce toxins	Abstracst	Tree	Year Usage
8	EGFR	proportion conducted lower comparison estimated higher assess independent versus	Abstracst	Tree	Year Usage
9	BIOACTIVE	oxidative antioxidant scenario beneficial phytochemicals flavonoids dietary compounds polyphenols	Abstracst	Tree	Year Usage
10	BIOFILMS	tissues peritoneal genome skin inflamed gingival bacterial periodontitis colonization	Abstracst	Tree	Year Usage

B - *abstract* (2 primeiros resumos de 20 artigos relacionados)

1 4601 157 NDRG2 MRNA LEVELS AND MIR-28-5P AND MIR-650 ACTIVITY IN CHRONIC LYMPHOCYTIC LEUKEMIA. BACKGROUND: NDRG2 IS IDENTIFIED AS A TUMOR SUPPRESSOR GENE IN MANY TUMORS, AND FUNCTIONS IN CELL PROLIFERATION, DIFFERENTIATION AND APOPTOSIS. RECENT DATA INDICATE THAT NDRG2 EXPRESSION IS UP-REGULATED BY TP53. MOREOVER, PROPOSED MECHANISMS OF NDRG2 INACTIVATION INCLUDE EPIGENETIC SILENCING OF THE NDRG2 PROMOTER AND DOWN-REGULATION BY MICRORNAS (MIRNAS). HOWEVER, FEW STUDIES HAVE EVER BEEN DONE ON THE ROLE OF NDRG2 AND THE NDRG2-REGULATING MIRNAS INTERFERENCE IN CHRONIC LYMPHOCYTIC LEUKEMIA (CLL). METHODS: NDRG2 AND MICRORNAS MRNA LEVELS IN CLL SUBJECTS WERE ASSESSED BY QUANTITATIVE REAL-TIME POLYMERASE CHAIN REACTION (QRT-PCR). THE DUAL-LUCIFERASE REPORTER ASSAY WAS PERFORMED TO DETERMINE NDRG2-RELATED MIRNAS. LOW EXPRESSION OF MATURE EXOGENOUS MIRNAS IN CLL CELLS WAS ESTABLISHED BY TRANSIENT TRANSFECTION. NDRG2 PROTEIN LEVELS IN CLL CELLS WERE DETECTED BY WESTERN BLOT. IN ADDITION, FLOW CYTOMETRY WAS CONDUCTED TO EXAMINE THE APOPTOSIS OF CLL CELLS. RESULTS: LOWER EXPRESSION OF NDRG2 WAS FOUND IN THE B-CELLS FROM 102 CLL PATIENTS COMPARED THE 40 NORMAL SUBJECTS (P < 0.001). PATIENTS WITH ADVANCED BINET STAGE (P = 0.001), HIGH LACTATE DEHYDROGENASE (LDH) LEVEL (P = 0.036), UN-MUTATED IMMUNOGLOBULIN HEAVY CHAIN VARIABLE REGION GENE (IGHV) (P = 0.004) AND THOSE WITH P53 ABERRATIONS (P < 0.001) HAD A MARKEDLY LOWER LEVELS OF NDRG2 MRNA. THIS DECREASE WAS ASSOCIATED WITH BRIEFER TIME-TO-TREATMENT (P = 0.001) AND POORER SURVIVAL (P < 0.001). HIGH EXPRESSION OF MIR-28-5P AND MIR-650 WAS ASSOCIATED WITH BINET B/C STAGE (P = 0.044) AND IGHV UN-MUTATED (P = 0.011), AS WELL AS BINET B/C STAGE (P = 0.013) AND P53 ABERRATIONS (P = 0.037), RESPECTIVELY. INHIBITION OF MIR-28-5P OR MIR-650 COULD INDUCE MORE APOPTOSIS IN CLL CELLS WITH GERMLINE TP53. CONCLUSIONS: NDRG2 MRNA LEVELS MIGHT BE A USEFUL PROGNOSTIC VARIABLE FOR PATIENTS OF CLL AND UP-REGULATING NDRG2 TRANSCRIPTION MAY BE A THERAPY APPROACH IN CLL WITHOUT P53 ABERRATIONS. 2018

2 4245 44 METHYLATION STATUS OF DDIT3 GENE IN CHRONIC MYELOID LEUKEMIA. BACKGROUND: DNA-DAMAGE-INDUCIBLE TRANSCRIPT 3 (DDIT3), A CANDIDATE TUMOR SUPPRESSOR GENE (TSG), HAS BEEN FOUND INVOLVED IN THE REGULATION OF CELLULAR GROWTH AND DIFFERENTIATION. THE EPIGENETIC CHANGES OF TSGS ARE RECENTLY RECOGNIZED AS AN ABNORMAL MECHANISM CONTRIBUTING TO THE DEVELOPMENT OF CHRONIC MYELOID LEUKEMIA (CML). THE AIM OF THIS STUDY WAS TO INVESTIGATE THE METHYLATION STATUS OF DDIT3 GENE IN CML PATIENTS. METHODS: THE METHYLATION STATUS OF DDIT3 PROMOTER WAS DETECTED IN THE BONE MARROW MONONUCLEAR CELLS FROM 53 PATIENTS WITH CML USING METHYLATION-SPECIFIC PCR (MSP). THE EXPRESSION LEVELS OF DDIT3 AND BCR/ABL TRANSCRIPT WERE DETERMINED BY REAL-TIME QUANTITATIVE PCR (RQ-PCR). CLINICAL DATA OF THESE PATIENTS WERE COLLECTED AND ANALYZED. RESULTS: THE ABERRANT METHYLATION OF DDIT3 GENE PROMOTER WAS FOUND IN 35 OF 53 (66%) CML CASES. CORRELATION WAS NOT FOUND BETWEEN DDIT3 PROMOTER HYPERMETHYLATION AND THE AGE, SEX, HEMOGLOBIN CONCENTRATION, PLATELET COUNTS, CHROMOSOMAL ABNORMALITIES, BCR/ABL

C - *tree* (árvore com termos próximos ao selecionado)



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A - TEXT.html (10 primeiros títulos de 6.918)

Cod	Title+Abstracts **B**
1	ON DECEMBER 5, 2017, THE NATIONAL ACADEMIES OF SCIENCES, ENGINEERING, AND MEDICINE HOSTED A PUBLIC WORKSHOP TITLED NUTRIGENOMICS AND THE FUTURE OF NUTRITION IN WASHINGTON, DC, TO REVIEW CURRENT KNOWLEDGE IN THE FIELD OF NUTRIGENOMICS AS IT RELATES TO NUTRITION
2	"DRY MOUTH" AND "FLAMMER" SYNDROMES-NEGLECTED RISKS IN ADOLESCENTS AND NEW CONCEPTS BY PREDICTIVE, PREVENTIVE AND PERSONALISED APPROACH
3	"EPIGENOME-WIDE METHYLATION PROFILE OF CHRONIC KIDNEY DISEASE-DERIVED ARTERIAL DNA UNCOVERS NOVEL PATHWAYS IN DISEASE-ASSOCIATED CARDIOVASCULAR PATHOLOGY
4	"MIX OF MICS"- PHENOTYPIC AND BIOLOGICAL HETEROGENEITY OF "MULTIPOTENT" MUSCLE INTERSTITIAL CELLS (MICS)
5	"THE MOTHERS HAVE EATEN UNRIPE GRAPES AND THE CHILDREN'S TEETH ARE SET ON EDGE": THE POTENTIAL INTER-GENERATIONAL EFFECTS OF THE HOLOCAUST ON CHRONIC MORBIDITY IN HOLOCAUST SURVIVORS' OFFSPRING
6	'BIOLOGIC MEMORY' IN RESPONSE TO ACUTE KIDNEY INJURY: CYTORESISTANCE, TOLL-LIKE RECEPTOR HYPER-RESPONSIVENESS AND THE ONSET OF PROGRESSIVE RENAL DISEASE
7	'BIOLOGIZING' PSYCHOPATHY: ETHICAL, LEGAL, AND RESEARCH IMPLICATIONS AT THE INTERFACE OF EPIGENETICS AND CHRONIC ANTISOCIAL CONDUCT
8	'OMIC' GENETIC TECHNOLOGIES FOR HERBAL MEDICINES IN PSYCHIATRY
9	'TRAINED IMMUNITY': CONSEQUENCES FOR LYMPHOID MALIGNANCIES
10	14-3-3 LIGAND PREVENTS NUCLEAR IMPORT OF C-ABL PROTEIN IN CHRONIC MYELOID LEUKEMIA

B - *abstract* (4 primeiros resumos de 20 artigos relacionados)

1 1 52 ON DECEMBER 5, 2017, THE NATIONAL ACADEMIES OF SCIENCES, ENGINEERING, AND MEDICINE HOSTED A PUBLIC WORKSHOP TITLED NUTRIGENOMICS AND THE FUTURE OF NUTRITION IN WASHINGTON, DC, TO REVIEW CURRENT KNOWLEDGE IN THE FIELD OF NUTRIGENOMICS AS IT RELATES TO NUTRITION. WORKSHOP PARTICIPANTS EXPLORED THE INFLUENCE OF GENETIC AND EPIGENETIC EXPRESSION ON NUTRITIONAL STATUS AND THE POTENTIAL IMPACT OF PERSONALIZED NUTRITION ON HEALTH MAINTENANCE AND CHRONIC DISEASE PREVENTION. THIS PUBLICATION SUMMARIZES THE PRESENTATIONS AND DISCUSSIONS FROM THE WORKSHOP. 2018

2 4809 20 OBESITY PREVENTION. ONCE CONSIDERED A PROBLEM ONLY IN HIGH-INCOME COUNTRIES (HICS), OBESITY HAS BECOME A MAJOR CONTRIBUTOR TO THE GLOBAL DISEASE BURDEN (FINUCANE AND OTHERS 2011; MISRA AND KHURANA 2008). EXCESS ADIPOSITY, PARTICULARLY AROUND THE VISCERAL ABDOMINAL REGION, IS AN IMPORTANT RISK FACTOR FOR MORBIDITY AND MORTALITY FROM TYPE 2 DIABETES, CARDIOVASCULAR DISEASES, AND SOME CANCERS (DANAEI AND OTHERS 2009; WHITLOCK AND OTHERS 2009; WHO 2009). ALTHOUGH SOME STUDIES HAVE SUGGESTED LOWER MORTALITY AMONG OVERWEIGHT OR OBESE PERSONS THAN AMONG HEALTHY-WEIGHT PERSONS (CARNETHON AND OTHERS 2012), THIS OUTCOME HAS NOT BEEN OBSERVED IN STUDIES THAT PROPERLY ACCOUNT FOR THE CONFOUNDING EFFECTS OF SMOKING, PREEXISTING CHRONIC CONDITIONS, AND OTHER BIASES (GLOBAL BMI MORTALITY COLLABORATION 2016; TOBIAS, PAN, AND HU 2014). THE COSTS OF OBESITY AND COMORBID CONDITIONS ARE STAGGERING AS MEASURED BY BOTH HEALTH CARE EXPENDITURES AND QUALITY OF LIFE, UNDERSCORING THE IMPORTANCE OF IMPLEMENTING OBESITY PREVENTION STRATEGIES AND TREATMENT STRATEGIES ON A GLOBAL SCALE. THE CHANGES NEEDED TO REVERSE GLOBAL TRENDS IN OBESITY WILL LIKELY REQUIRE NUMEROUS INTERVENTIONS AND POLICY RECOMMENDATIONS THAT TARGET DIET, LIFESTYLE, ACCESS TO CARE, AND ENVIRONMENTAL RISK FACTORS. IN THIS CHAPTER, WE SUMMARIZE THE GLOBAL BURDEN OF OBESITY AND THE IMPACT OF A SPECTRUM OF OBESITY RISK FACTORS, RANGING FROM SOCIOPOLITICAL AND ECONOMIC FORCES THAT ARE LARGELY BEYOND AN INDIVIDUAL'S CONTROL TO MODIFIABLE LIFESTYLE FACTORS, AND DISCUSS GENETIC AND EPIGENETIC RISKS. WE ALSO REVIEW THE EFFECTIVENESS OF POPULATION-BASED INTERVENTIONS AND POLICIES FOR PREVENTING OBESITY, SOME INDIVIDUAL-LEVEL TREATMENT OPTIONS ACROSS VARIOUS PLATFORMS, AND THE COST-EFFECTIVENESS OF SELECT INTERVENTIONS. 2017

3 5000 16 PERINATAL PROGRAMMING PREVENTION MEASURES. OVER THE PAST 10 YEARS, THERE HAS BEEN OUTSTANDING SCIENTIFIC PROGRESS RELATED TO PERINATAL PROGRAMMING AND ITS EPIGENETIC EFFECTS IN HEALTH, AND WE CAN ANTICIPATE THIS TREND WILL CONTINUE IN THE NEAR FUTURE. WE NEED TO MAKE USE AND APPLY THESE ACHIEVEMENTS TO HUMAN NEURODEVELOPMENT VIA PREVENTION INTERVENTIONS. BASED ON THE CONCEPT OF THE INTERACTION BETWEEN GENOME AND AMBIOME, THIS CHAPTER PROPOSES LOW-COST EASY-IMPLEMENTATION PREVENTIVE STRATEGIES FOR MATERNAL AND INFANT HEALTH INSTITUTIONS.BREASTFEEDING AND HUMAN MILK ADMINISTRATION ARE THE FIRST PREVENTIVE MEASURES, AS HAS BEEN REVIEWED IN THE POLICY STATEMENT OF THE AMERICAN ACADEMY OF PEDIATRICS. ANOTHER STRATEGY IS THE SAFE AND FAMILY-CENTERED MATERNITY HOSPITALS INITIATIVE THAT PROMOTES AND EMPOWERS THE INCLUSION OF THE FAMILIES AND THE RESPECT FOR THEIR RIGHTS, ESPECIALLY DURING PREGNANCY AND BIRTH. (THIS CHANGE OF PARADIGM WAS APPROVED AND IS RECOMMENDED BY BOTH UNITED NATIONS CHILDREN'S FUND, UNICEF, AND PAN AMERICAN HEALTH ORGANIZATION, PAHO.) THEN, THERE IS ALSO AN IMPORTANT EMPHASIS GIVEN TO THE SACRED HOUR-WHICH HIGHLIGHTS THE IMPACT OF BONDING, ATTACHMENT, AND BREASTFEEDING DURING THE FIRST HOUR OF LIFE-THE PAIN PREVENTION AND TREATMENT IN NEWBORNS, THE CONTROL OF THE "NEW MORBIDITY" REPRESENTED BY LATE PRETERM INFANTS, AND FINALLY, THE IMPORTANCE OF AVOIDING INTRAUTERINE AND EXTRAUTERINE GROWTH RESTRICTION. (HOWEVER, THERE ARE NOT YET CLEAR RECOMMENDATIONS ABOUT NUTRITIONAL INTERVENTIONS IN ORDER TO DIMINISH THE POTENTIAL METABOLIC SYNDROME CONSEQUENCE IN THE ADULT.). 2015

4 28 18 A BIOMIMETIC NATURAL SCIENCES APPROACH TO UNDERSTANDING THE MECHANISMS OF AGEING IN BURDEN OF LIFESTYLE DISEASES. THE WORLDWIDE LANDSCAPE OF AN AGEING POPULATION AND AGE-RELATED DISEASE BRINGS WITH IT HUGE SOCIO-ECONOMIC AND PUBLIC HEALTHCARE CONCERNS ACROSS NATIONS. CORRESPONDINGLY, MONUMENTAL HUMAN AND FINANCIAL RESOURCES HAVE BEEN INVESTED IN BIOMEDICAL RESEARCH, WITH A MISSION TO DECODE THE MECHANISMS OF AGEING AND HOW THESE CONTRIBUTE TO AGE-RELATED DISEASE. MULTIPLE HALLMARKS OF AGEING HAVE BEEN IDENTIFIED THAT ARE COMMON ACROSS TAXA, HIGHLIGHTING THEIR FUNDAMENTAL IMPORTANCE. THESE INCLUDE DYSREGULATED MITOCHONDRIAL METABOLISM AND TELOMERES BIOLOGY, EPIGENETIC MODIFICATIONS, CELL-MATRIX INTERACTIONS, PROTEOSTASIS, DYSREGULATED NUTRIENT SENSING, STEM CELL EXHAUSTION, INFLAMMAGEING AND IMMUNO-SENESCENCE. WHILE OUR UNDERSTANDING OF THE MOLECULAR BASIS OF AGEING IS IMPROVING, IT REMAINS A COMPLEX AND MULTIFACTORIAL PROCESS THAT REMAINS TO BE FULLY UNDERSTOOD. A KEY ASPECT OF THE SHORTFALL IN OUR UNDERSTANDING OF THE AGEING PROCESS LIES IN TRANSLATING DATA FROM STANDARD ANIMAL MODELS TO HUMANS. CONSEQUENTLY, WE SUGGEST THAT A 'BIOMIMETIC' AND COMPARATIVE APPROACH, INTEGRATING KNOWLEDGE FROM SPECIES IN THE WILD, AS OPPOSED TO INBRED GENETICALLY HOMOGENOUS LABORATORY ANIMALS, CAN PROVIDE POWERFUL INSIGHTS INTO HUMAN AGEING PROCESSES. HERE WE DISCUSS SOME PARTICULARITIES AND COMPARATIVE PATTERNS AMONG SEVERAL SPECIES FROM THE ANIMAL KINGDOM, ENDOWED WITH LONGEVITY OR SHORT LIFESPANS AND UNIQUE METABOLIC PROFILES THAT COULD BE POTENTIALLY EXPLOITED TO THE UNDERSTANDING OF AGEING AND AGE-RELATED DISEASES. BASED UPON LESSONS FROM NATURE, WE ALSO HIGHLIGHT SEVERAL AVENUES FOR RENEWED FOCUS IN THE PATHOPHYSIOLOGY OF AGEING AND AGE-RELATED DISEASE (I.E. DIET-MICROBIOME-HEALTH AXIS, OXIDATIVE PROTEIN DAMAGE, ADAPTIVE HOMOEOSTASIS AND PLANETARY HEALTH). WE PROPOSE THAT A BIOMIMETIC ALLIANCE WITH COLLABORATIVE RESEARCH FROM DIFFERENT DISCIPLINES CAN IMPROVE OUR UNDERSTANDING

METODOLOGIA

Análise exploratória dos Resultados

Cod	WORD	Related words	Link Title	Link Abstracts	Link Graphic
1	BIOTRANSFORMATION	indirect genotoxic toxicants radicals adducts chemical toxic chemicals xenobiotic	Abstracst	Tree	Year Usage
2	BIOTIC	multigenerational repetitive progeny mammals concentrations anion isogenic sativa a	Abstracst	Tree	Year Usage
3	BIOTIN	consumption ethanol mimics acinar incubation uptake exerted palmitate multivitamin	Abstracst	Tree	Year Usage
4	BIOLOGICAL	focused future individuals related among linked particularly multiple relevant	Abstracst	Tree	Year Usage
5	BIOLOGY	understanding insights future knowledge defining precise fundamental current perspective	Abstracst	Tree	Year Usage

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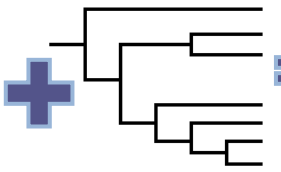

.TREE

80 *papers*

Cod	Title+Abstracts
1	ON DECEMBER 5, 2017, THE NATIONAL ACADEMIES OF SCIENCES, ENGINEERING, AND MEDICINE HOSTED A PUBLIC WORKSHOP TITLED NUTRIGENOMICS AND THE FUTURE OF NUTRITION IN WASHINGTON, DC, TO REVIEW CURRENT KNOWLEDGE IN THE FIELD OF NUTRIGENOMICS AS IT RELATES TO NUTRITION
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TEXT.html

525 *papers*

- Exploração inicial (*WORDS* + dendrogramas + artigos relacionados);
- Exploração complementar (*.TREE* + novos termos + artigos relacionados [*pain]*);
- Registro e organização de artigos relevantes;
- Treinamento (80 *papers*) e Expansão com o algoritmo treinado (226 *papers*);
- Consolidação dos grupos temáticos.

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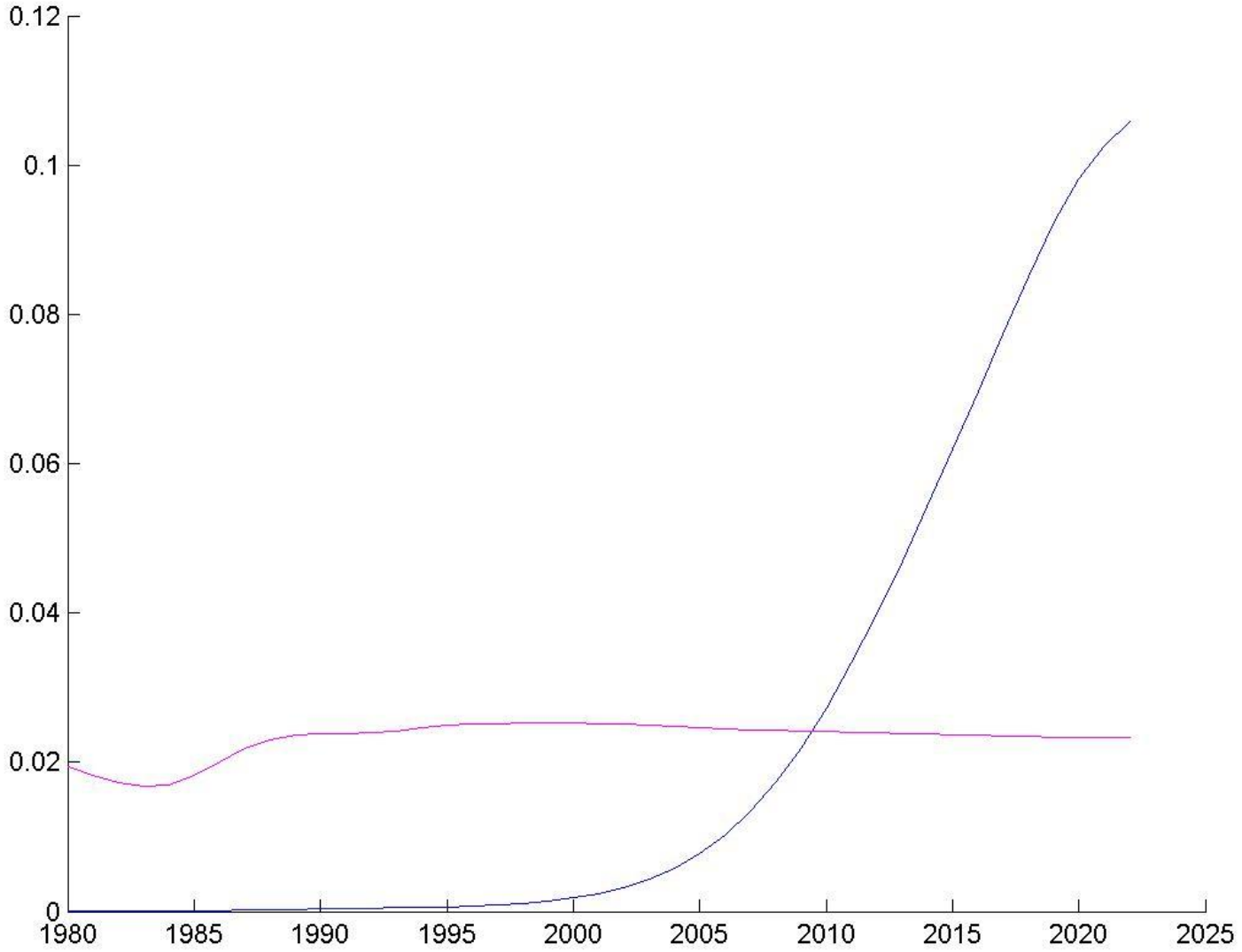
METODOLOGIA

Cienciometria

133 papers

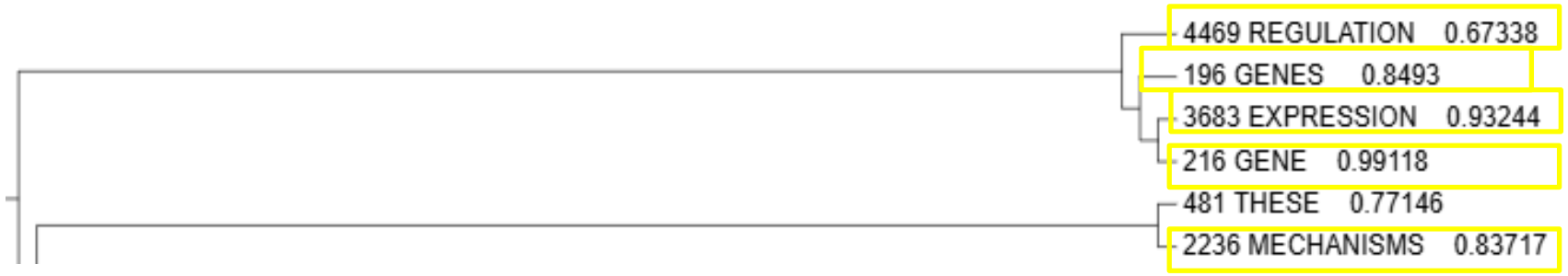
icons paper designed by studiogstock / Freepik

RESULTADOS PARCIAIS



RESULTADOS PARCIAIS

Ramo da árvore de palavras (epigenética)

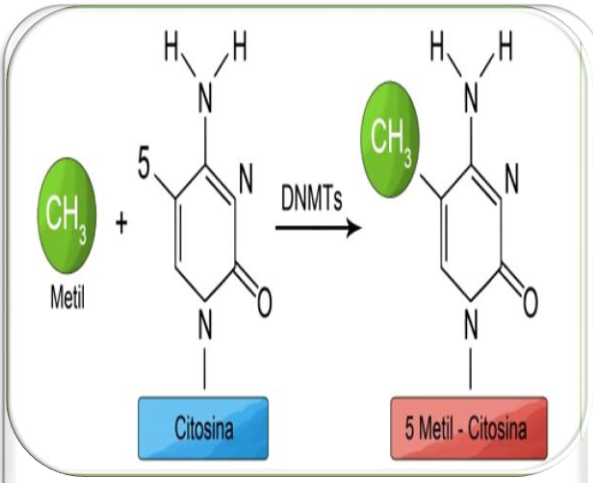


Mudanças herdáveis na expressão gênica, sem alterar a sequência original do DNA.

Mortaz et al. (2011)

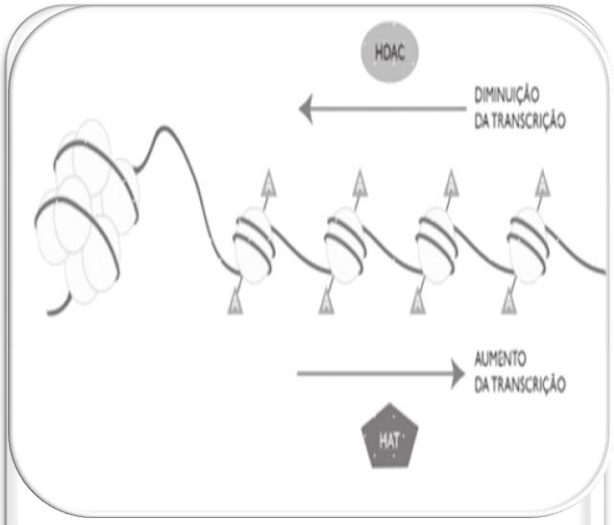
RESULTADOS PARCIAIS

Regulação da Expressão Gênica



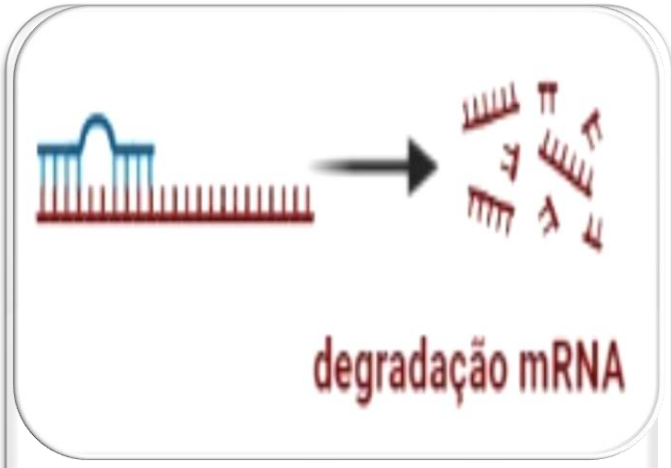
Metilação do DNA

Silenciamento através da metilação do DNA



Acetilação de cuadas de Histonas

Abertura para transcrição através da acetilação de caudas de histonas



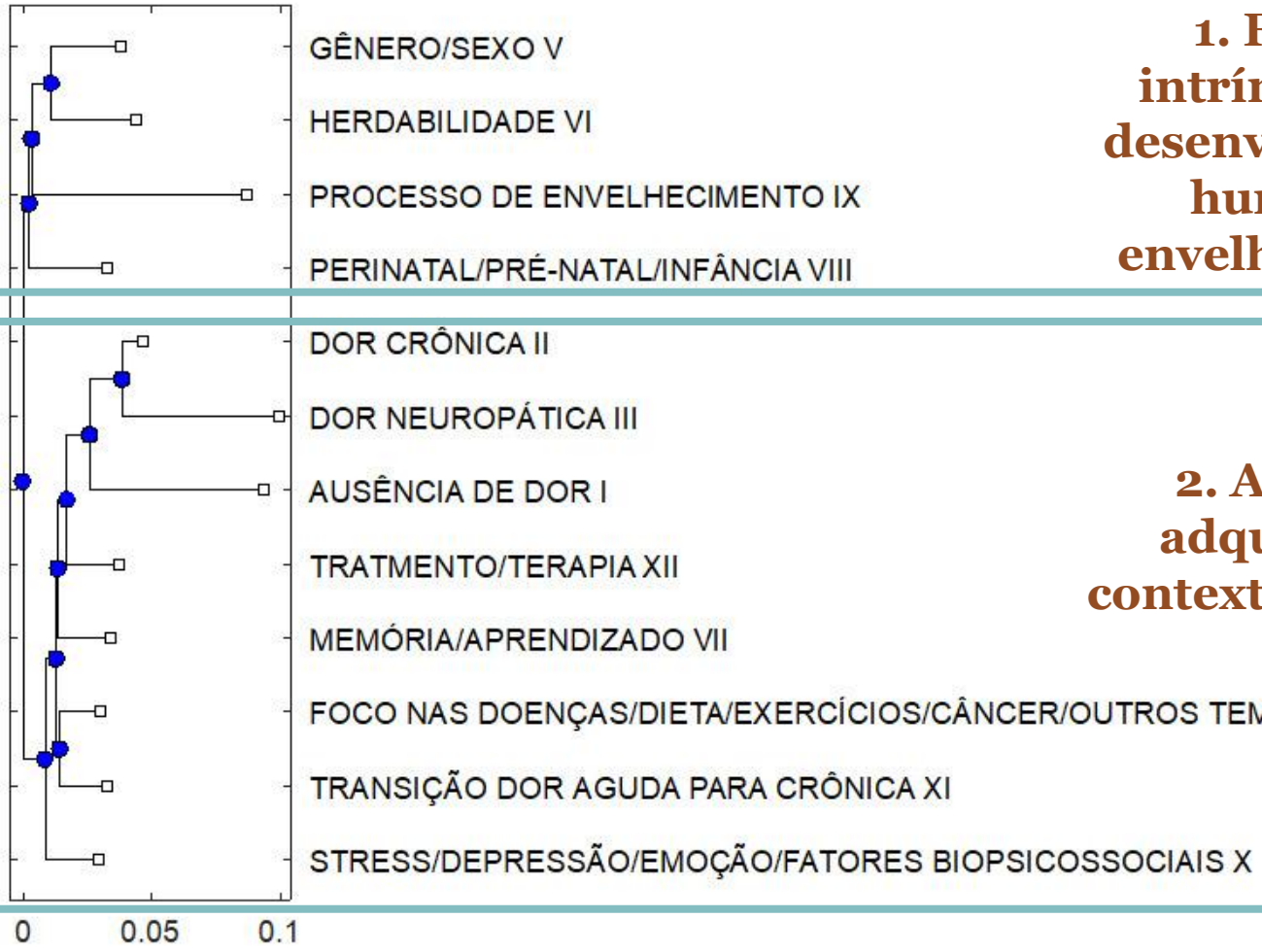
miRNAs

Pós-transcricionais pela degradação mRNA por miRNAs

(BAI; REN; DUBNER, 2015; MAUCERI, 2022)

RESULTADOS PARCIAIS

Os 12 temas agrupados por similaridade de texto

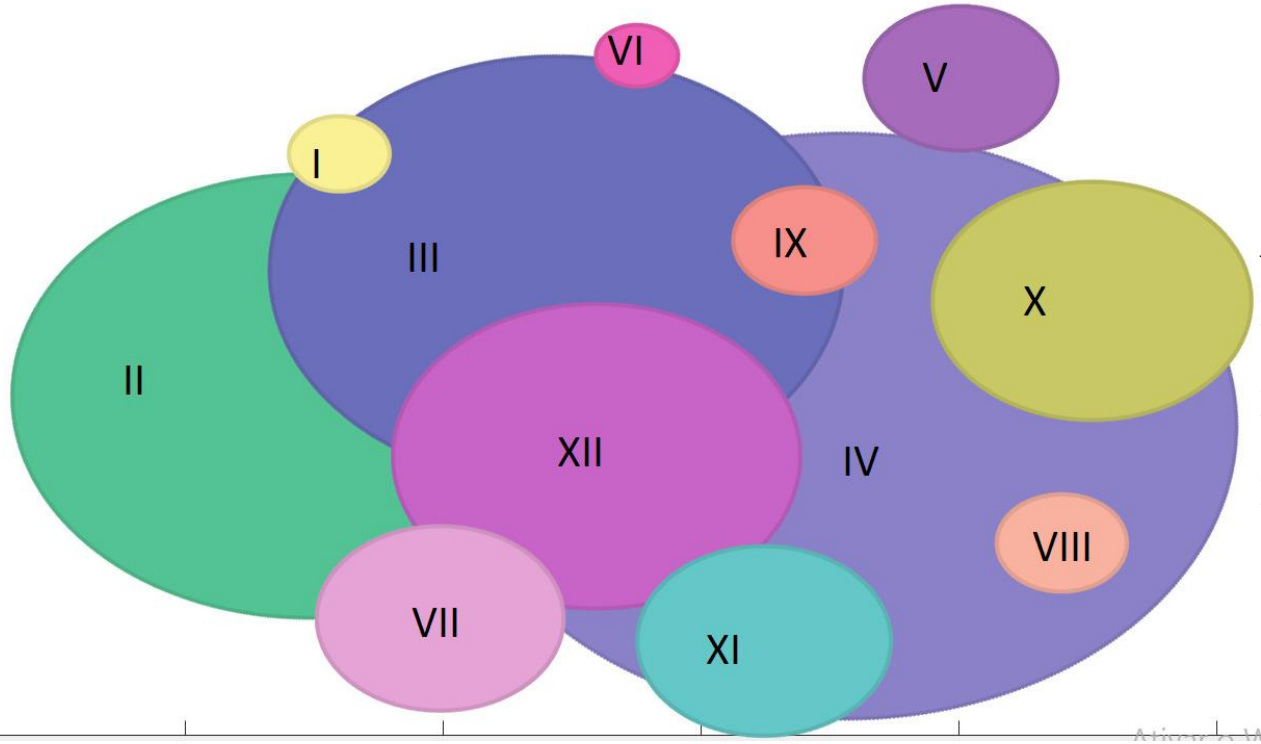


1. Fatores intrínsecos do desenvolvimento humano e envelhecimento

2. Aspectos adquiridos e contextuais da dor

RESULTADOS PARCIAIS

Os 12 temas pela frequência nos arranjos



Legenda:

Grupo 1

V gênero/sexo
VI herdabilidade
VIII perinatal/pré-natal/ infância
IX processo de envelhecimento

Grupo 2

I ausência de dor
II dor crônica
III dor neuropática
IV doenças/dieta/ exercícios/câncer
VII memória/aprendizado
X estresse/depressão/ emocional/biopsicossociais
XI transição de dor aguda para crônica
XII tratamento/terapia

RESULTADOS PARCIAIS

1 . Fatores intrínsecos do desenvolvimento humano e envelhecimento

- V gênero/sexo
  = hormônios sexuais;
- VI herdabilidade
  = alterações de longo prazo transmitidas para gerações seguintes;
- VIII perinatal/pré-natal/infância
  = a saúde pode ser moldada desde a gestação;
- IX processo de envelhecimento
  = impacto de alterações de longo prazo;

(KAUTZKY-WILLER, 2014)

- VIII perinatal/pré-natal/infância
  = Prevalência de dor crônica X período pré e pós natal

(KODILA et al., 2024)

RESULTADOS PARCIAIS

2 . Aspectos adquiridos e contextuais da dor

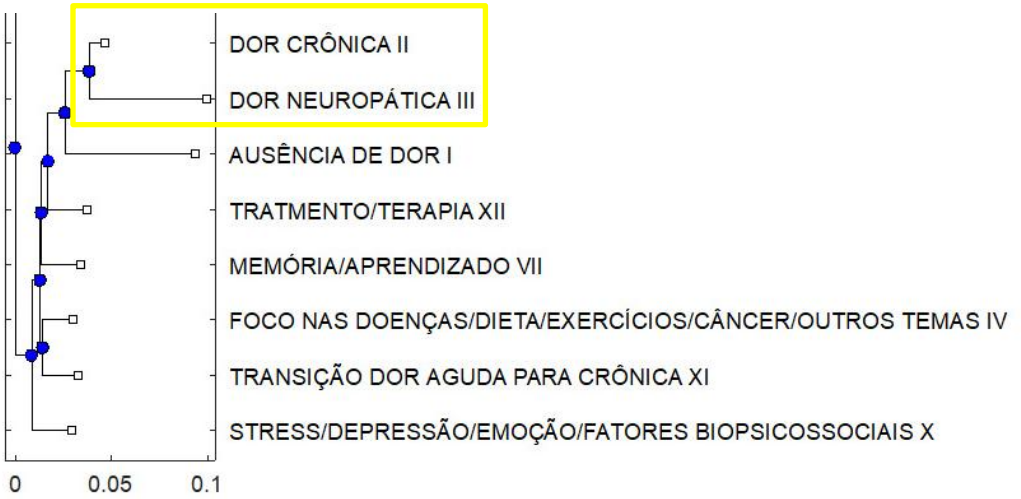
- II dor crônica

  = sensibilização central;

(HENDRIX et al., 2020)

  = poucos estudos;

(DESCALZI et al., 2015)



RESULTADOS PARCIAIS

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Epigenetic and miRNA Expression Changes in People with Pain: A Systematic Review

Andrea Polli,[*,†,‡] Lode Godderis,[‡,§] Manosij Ghosh,[†,‡] Kelly Ickmans,[*,†,¶] and Jo Nijs[*,¶]

- 37 artigos;
- Vária limitações;
- Apenas dois dos mecanismos epigenéticos;
- Potencial para compreensão e tratamento;

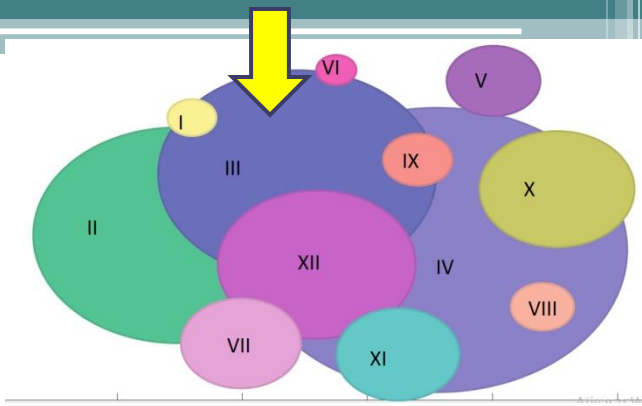
RESULTADOS PARCIAIS

Tipos de dor crônica

- A dor crônica é subdividida em:
- (1) dor primária crônica; — primárias
- (2) dor crônica relacionada ao câncer; — secundárias
- (3) dor crônica pós-cirúrgica ou pós-traumática;
- (4) dor neuropática crônica;
- (5) cefaleia secundária crônica ou dor orofacial;
- (6) dor visceral secundária crônica; e
- (7) dor musculoesquelética secundária crônica.

6007 - citação (Treede et al., 2019)

RESULTADOS PARCIAIS



2 . Aspectos adquiridos e contextuais da dor

- III dor neuropática
  = maior desafio, diferenciar de outras dores;

Canais iônicos	Expressão	Função	Efeito
TRP Potencial Receptor Transitório (TRPV1 e TRPA1)	Neurônios sensoriais periféricos	Transdução nociceptiva e codificação térmica (pró-nociceptivo)	Hipersensibilidade neuropática (roedores)
Na_V Canais de Sódio Dependentes de voltagem (Nav1.1, Nav1.6, Nav1.7, Nav1.8 e Nav1.9)	Neurônios sensoriais periféricos	Excitabilidade dos nervos sensoriais (pró-nociceptivo)	Distúrbios de dor neuropática (humanos)
HCN Canais ativados por hiperpolarização e dependentes de nucleotídeos cíclicos	Neurônios sensoriais periféricos	Geração de uma corrente retificadora interna ativada por hiperpolarização (Ih) (pró-nociceptivo)	Hipersensibilidade neuropática (roedores) Atividade espontânea nociceptores
$Ca_v3.2$ Canais de Cálcio Dependentes de voltagem	Vias nociceptivas somatossensoriais	Excitabilidade celular e neurotransmissão (pró-nociceptivo)	Sensibilização nociceptiva
K_v Canais de Potássio Dependentes de voltagem $K_v1.1$ e $K_v1.2$	Circuitos sensório-espinhais	Excitabilidade neuronal	Modulação seletiva da alodinia
GABA Canais iônicos para ácido gama-aminobutírico	Neurônios DRG	Transmissão glutamatérgica	Repressão da excitabilidade em neurônios sensoriais

(FINNERUP, KUNER e JENSEN, 2021)

RESULTADOS PARCIAIS

2 . Aspectos adquiridos e contextuais da dor

- I ausência de dor
  = caminho inverso (SCN9A e PRDM12);

(LATRAGNA *et al*., 2021; LISCHKA *et al*., 2022)

- XII tratamento/terapia
  = oportunidade/ alterações dinâmicas – lacunas: biomarcadores e efeitos de longo prazo;

(SEO et al., 2013; NIEDERBERGER et al.,2017)

RESULTADOS PARCIAIS

2 . Aspectos adquiridos e contextuais da dor

- VII memória/aprendizado

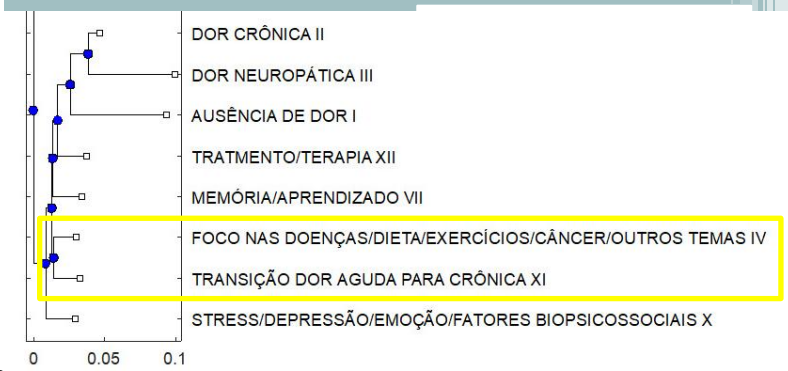
  = “traços de memória” + plasticidade / sensibilização (aprendizado da dor);

(ALVARADO et al., 2015; RAHN; GUZMAN-KARLSSON; DAVID SWEATT, 2013);

= memória da dor neuropática HDAC2

(MAIARÚ et al., 2016)

RESULTADOS PARCIAIS



2 . Aspectos adquiridos e contextuais da dor

- <u>XI transição dor aguda para crônica</u>

  = homeostase X fatores genéticos / epigenéticos / ambientais e histórico de vida;

(CHAPMAN, TUCKETT e SONG, 2008)

- <u>IV doenças/dieta/exercícios/câncer</u>

  = estudos em fase pré-clínico;

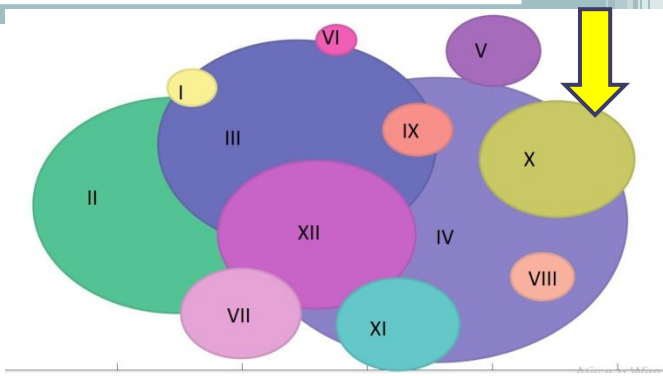
  = epigenética X fatores abientais;

(ODELL, 2018)

  = vitaminas/folato (metil) e fermentação da microbiota (acetil);

(JIMÉNEZ-CHILLAÓN et al., 2012)

RESULTADOS PARCIAIS



2 . Aspectos adquiridos e contextuais da dor

- <u>X estresse/depressão/emoção/fatores biopsicossociais</u>

  = fatores biológicos, sociais e psicológicos são indivisíveis;

  = BDNF – sensibilização central/neuroplasticidade;

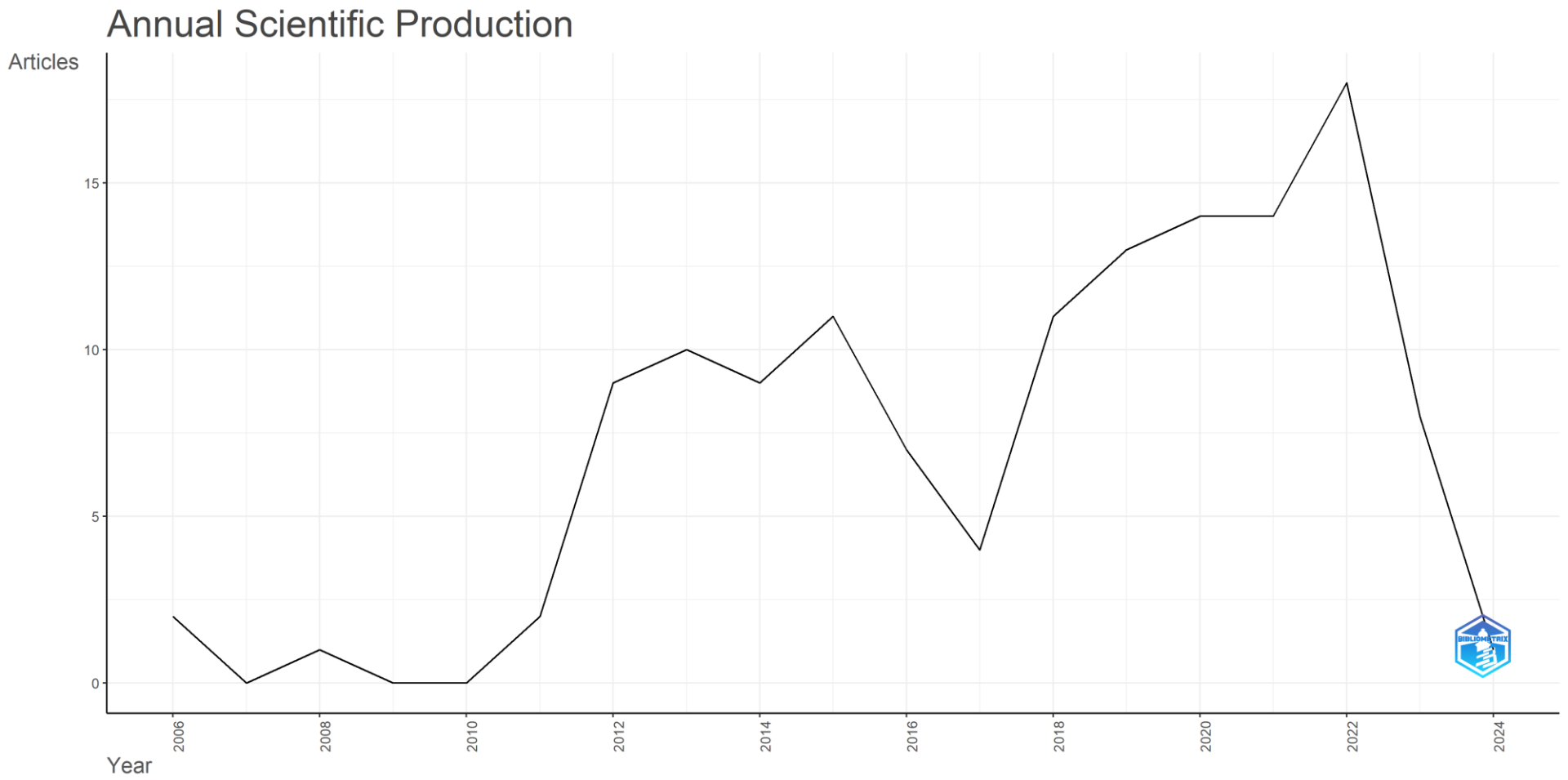
(PAOLONI-GIACOBINO et al., 2020)

= relação entre estresse e depressão com dor visceral;

(LIU et al., 2022; OŚWIĘCIMSKA et al., 2017; ZHOU; VERNE, 2022)

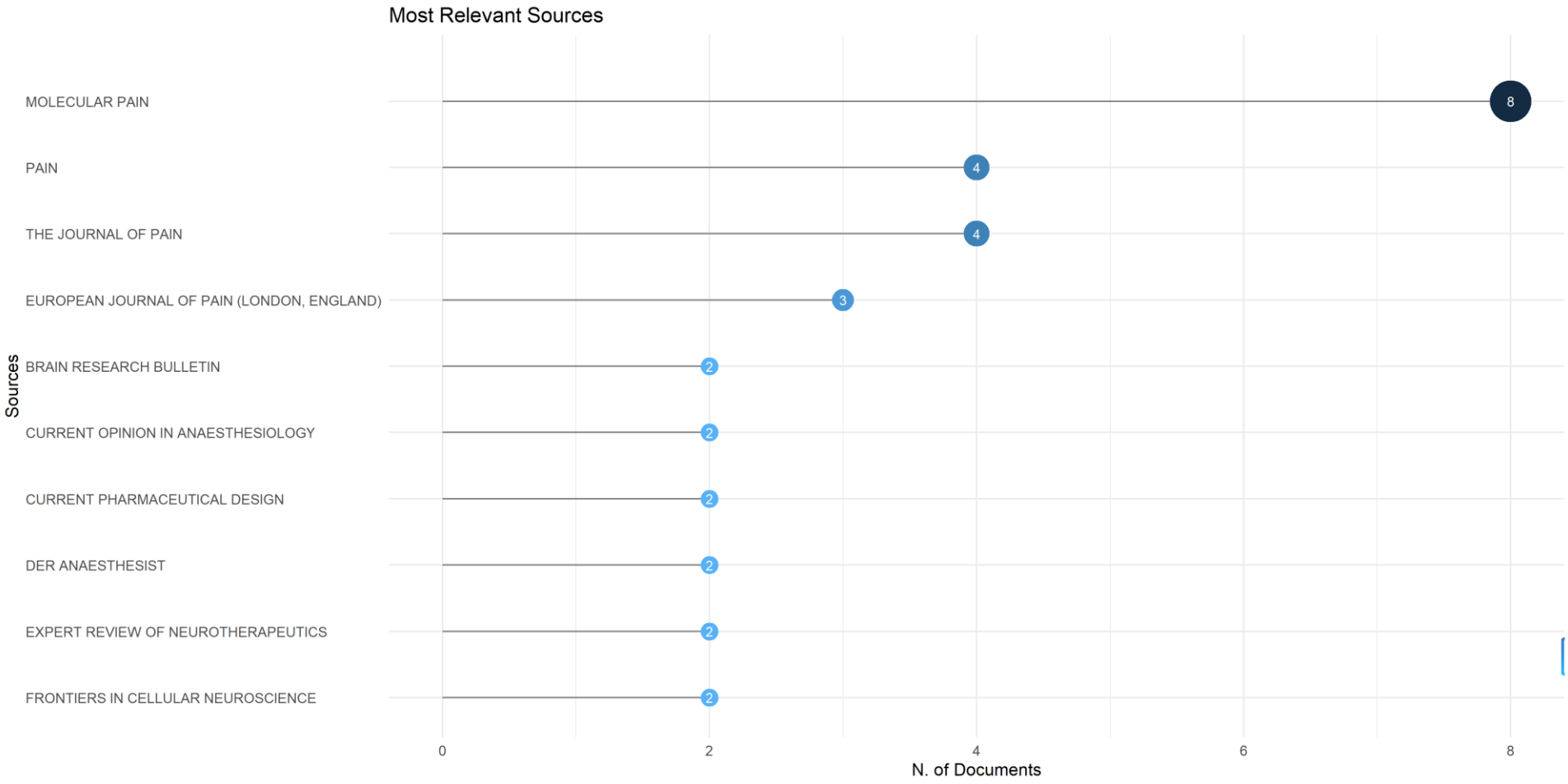
RESULTADOS PARCIAIS

Publicações ao longo dos anos

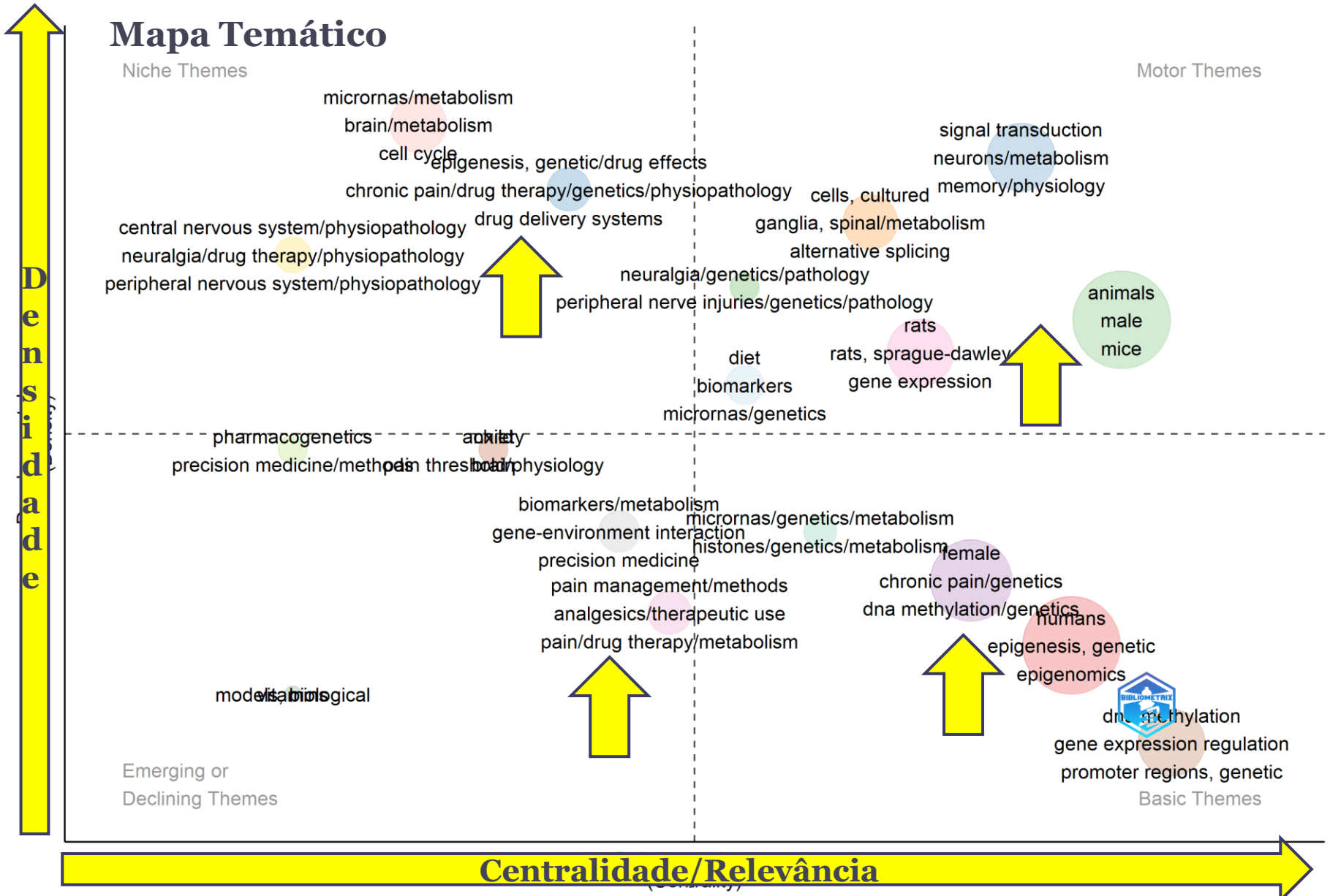


RESULTADOS PARCIAIS

Fontes Mais Relevantes



RESULTADOS PARCIAIS



RESULTADOS PARCIAIS

Em resumo:

1- Promove uma integração interdisciplinar dos estudos;

2- Aplica uma abordagem inovadora de bioinformática;

3- Identifica dois grandes blocos temáticos que estruturam o campo;

4- Oferece um mapeamento cienciométrico para orientar novos pesquisadores;

5- Aponta como a epigenética pode subsidiar biomarcadores, terapias personalizadas e estratégias de prevenção da cronificação da dor.

RESULTADOS FUTUROS

Cronograma

Legenda
- Realizado
- Em andamento
- Realizar

Atividades a serem desenvolvidas	2023	2024		2025			
	S2	S1	S2	S1	S2		
					OUT	NOV	DEZ
Elaborar consulta a ser aplicada na base de dados *PubMed*;							
Realizar a consulta na base PubMes e extrair os resultados;							
Vetorizar os resultados da consulta;							
Realizar as tarefas suporte nas abordagens Matlab para criação dos arquivos HTML-TM;							
Examinar as árvores de palavras os títulos e resumos em busca de *gaps* na literatura em relação a temática;							
Realizar e interpretação, discussão dos resultados e mapeamento da literatura.							
Escrever o Artigo							
Submeter o Artigo							
Defender a Dissertação							

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