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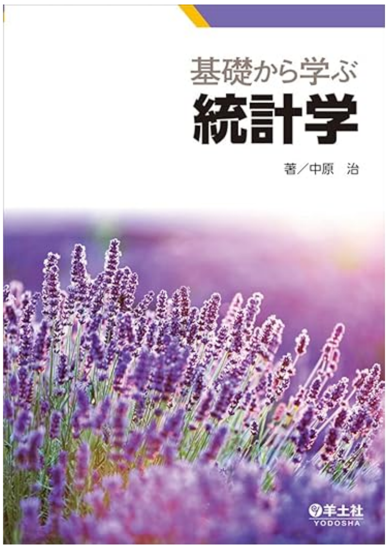

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Diet shapes the metabolite profile in the intact human ileum, which affects PYY release

https://www.science.org/doi/10.1126/scitranslmed.adm8132

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Dietary fiber alleviates alcoholic liver injury via *Bacteroides acidifaciens* and subsequent ammonia detoxification

https://www.sciencedirect.com/science/article/abs/pii/S1931312824002269?via%3Dihub

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[illegible] Nature Microbiology[illegible]

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Dietary fibre directs microbial tryptophan metabolism via metabolic interactions in the gut microbiota

https://www.nature.com/articles/s41564-024-01737-3

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Microbial community-scale metabolic modelling predicts personalized short-chain fatty acid production profiles in the human gut

https://www.nature.com/articles/s41564-024-01728-4

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[illegible]Megamonas rupellensis[illegible]

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Obesity-enriched gut microbe degrades myo-inositol and promotes lipid absorption

https://www.cell.com/cell-host-microbe/abstract/S1931-3128(24)00230-0

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A maternal brain hormone that builds bone

https://www.nature.com/articles/s41586-024-07634-3

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[illegible]cellular communication network factor 3 (CCN3)[illegible]

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[illegible] Nature Communications[illegible]

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Effects of diets on risks of cancer and the mediating role of metabolites

https://www.nature.com/articles/s41467-024-50258-4

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[illegible] International Journal of Obesity[illegible]

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日本のコホート研究。

タイトルは

Skin carotenoid scores and metabolic syndrome in a general Japanese population: the Hisayama study

https://www.nature.com/articles/s41366-024-01575-7

この光センサー、カゴメさんが使用している「ベジチェック」というツールです。

このツールは皮膚に当てるだけで体内のカロテノイド（≒野菜の摂取量）を推定するというコンセプトで作られています。先行研究で実際に血中カロテノイド濃度とこのセンサーの値の一定の正相関が報告されており、現在このツールを使った研究をあちこちで行っているようです。

この研究は、日本でも有数のコホートの一つ、久山町コホートでの研究です。

40歳以上の男女約1600人を対象に調査を行い、ベジチェックでの測定スコア（≒体内カロテノイド濃度）とメタボリックシンドローム罹患歴の関連を調べている研究です。

結果として、カロテノイドスコアが最も高い四分位集団において、最も低い集団と比べてメタボリックシンドローム有無に対するオッズ比が低かったという報告をしています。

解釈としては、カロテノイドスコアというよりも野菜の摂取と捉えるのがいいのかなと思われます。

終わりに

今回はいかがだったでしょうか。

腸内細菌による肥満や代謝性疾患との関連は多数研究がある中で、肥満促進にここまで強く働く細菌はあまり見たことがなく、とても新鮮でした。

また、エストロゲンが下がってしまうという授乳期特有の減少に対してもちゃんとリカバリー策が用意されているヒトの体の仕組みにも、神秘的なものを感じてしまいました。

□

トップへ戻る

論文紹介へ戻る

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[illegible] Cell Reports [illegible]

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The microbiota drives diurnal rhythms in tryptophan metabolism in the stressed gut

https://www.cell.com/cell-reports/fulltext/S2211-1247(24)00407-8

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Diurnal rhythmicity of infant fecal microbiota and metabolites: A randomized controlled interventional trial with infant formula

https://www.sciencedirect.com/science/article/pii/S1931312824000581

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Dysfunctional circadian clock accelerates cancer metastasis by intestinal microbiota triggering accumulation of myeloid-derived suppressor cells

https://www.cell.com/cell-metabolism/abstract/S1550-4131(24)00172-4

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https://www.frontiersin.org/journals/nutrition/articles/10.3389/fnut.2024.1419978/full

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Targeting senescence induced by age or chemotherapy with a polyphenol-rich natural extract improves longevity and healthspan in mice

https://www.nature.com/articles/s43587-024-00663-7

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Functional multi-organelle units control inflammatory lipid metabolism of macrophages

https://www.nature.com/articles/s41556-024-01457-0

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Multikingdom and functional gut microbiota markers for autism spectrum disorder

https://www.nature.com/articles/s41564-024-01739-1

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Lipidome changes due to improved dietary fat quality inform cardiometabolic risk reduction and precision nutrition

https://www.nature.com/articles/s41591-024-03124-1

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Towards nutrition with precision: unlocking biomarkers as dietary assessment tools

https://www.nature.com/articles/s42255-024-01067-y

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Proteomic predictors of individualized nutrient-specific insulin secretion in health and disease

https://www.sciencedirect.com/science/article/pii/S0002916524003897

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Dietary fiber alleviates alcoholic liver injury via *Bacteroides acidifaciens* and subsequent ammonia detoxification

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Personalized drug screening using patient-derived organoid and its clinical relevance in gastric cancer

https://www.cell.com/cell-reports-medicine/fulltext/S2666-3791(24)00331-8

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A modified Mediterranean-style diet enhances brain function via specific gut-microbiome-brain mechanisms

https://www.tandfonline.com/doi/full/10.1080/19490976.2024.2323752

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Ketogenic diet-induced bile acids protect against obesity through reduced calorie absorption

https://www.nature.com/articles/s42255-024-01072-1

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Ketogenic diet induces p53-dependent cellular senescence in multiple organs

https://www.science.org/doi/10.1126/sciadv.ado1463

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Effects of ketogenic diet on health outcomes: an umbrella review of meta-analyses of randomized clinical trials

https://bmcmedicine.biomedcentral.com/articles/10.1186/s12916-023-02874-y

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Adherence to a planetary health diet, genetic susceptibility, and incident cardiovascular disease: a prospective cohort study from the UK Biobank

https://www.sciencedirect.com/science/article/abs/pii/S0002916524005860

こちらは英国のUKバイオバンクの研究で、PHDの遵守率が心血管疾患（CVD）、虚血性心疾患 (IHD)、心房細動 (AF)、心不全 (HF)、および脳卒中の発症と関連するかを調べています。

そしてこの研究はさらに一つ評価軸を加えており、遺伝的素因により上記の疾患リスクがもともと高い人においてもPHDの遵守が発症リスク低下につながるかも調べています。

被験者約11000人、追跡期間中央値9.9年のコホート研究データから上記の解析を行い、PHD遵守率が低い群と高い群に分けて比較することで解析を行っています。

結果として、PHD遵守率が高い方が上記いずれの疾患についても発症リスク低下と関連していること、この結果は遺伝的素因スコアと交互作用を示していなかったことを確認しており、遺伝的リスクに関係なくPHD遵守の高さと心血管疾患リスクの低下が関連していることを報告しています。

PHDの遵守率が死亡率低下と関連する The American Journal of Clinical Nutrition誌

PHDについての2つ目の論文は、PHDの遵守率と各種疾患による死亡リスクの関連を調べたコホート研究。

タイトルは

Planetary Health Diet Index and risk of total and cause-specific mortality in three prospective cohorts

https://www.sciencedirect.com/science/article/pii/S0002916524003897

こちらは、米国の有名な3つのコホート（the Nurses’ Health Study (1986–2019), the Nurses’ Health Study II (1989–2019), the Health Professionals Follow-up Study (1986–2018) ）から合計20万人近くの追跡データを取得し、PHDの遵守率と全死亡率、あるいは心血管疾患、ガン、呼吸器疾患、神経変性疾患などによる死亡率との関連を評価しています。

結果として、全死亡率、および上記で示した疾患においては、PHD遵守が高いほどそのリスクが低くなることを明らかにしています。

またこの研究が面白いのは、PHDそのものの趣旨である「環境影響への関連」についてもサブ解析を行っており、PHDの遵守が温室効果ガス排出量などと逆の関連を示すことも確認しています。

PHD[illegible] Nature Aging[illegible]

PHD[illegible]3[illegible]PHD[illegible]

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Adherence to the planetary health diet and cognitive decline: findings from the ELSA-Brasil study

https://www.nature.com/articles/s43587-024-00666-4

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PHD[illegible]PHD[illegible]

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Gut microbiota signatures of vulnerability to food addiction in mice and humans

https://gut.bmj.com/content/early/2024/05/17/gutjnl-2023-331445.long

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[illegible] Cell[illegible]

[illegible]IL-17A[illegible]IL-23R[illegible]

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Preclinical proof of principle for orally delivered Th17 antagonist miniproteins

https://www.cell.com/cell/fulltext/S0092-8674(24)00631-7

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[illegible] Cell Host & Microbe[illegible]

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Multi-omics signatures reveal genomic and functional heterogeneity of *Cutibacterium acnes* in normal and diseased skin

https://www.sciencedirect.com/science/article/abs/pii/S1931312824001963?via%3Dihub

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[illegible] Nature Metabolism[illegible]

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Ketogenic diet-induced bile acids protect against obesity through reduced calorie absorption

https://www.nature.com/articles/s42255-024-01072-1

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[illegible]D[illegible] Cell Reports[illegible]

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Hepatocyte vitamin D receptor functions as a nutrient sensor that regulates energy storage and tissue growth in zebrafish

https://www.cell.com/cell-reports/fulltext/S2211-1247(24)00721-6

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2024[illegible]7[illegible]3[illegible]/[illegible]4[illegible]

[illegible] Nature Communications

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Dietary L-Glu sensing by enteroendocrine cells adjusts food intake via modulating gut PYY/NPF secretion

https://www.nature.com/articles/s41467-024-47465-4

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[illegible] Nature Metabolism[illegible]

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Interaction between the gut microbiota and colonic enteroendocrine cells regulates host metabolism

https://www.nature.com/articles/s42255-024-01044-5

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先ほどの論文で紹介したEECは主に小腸を想定した研究でした（ハエではありましたが…）。

論文によると小腸EECに着目した研究は多いものの、大腸EECの役割について調べた研究は少なかったようです。

この研究ではまず大腸EEC欠損マウスを使用してその影響を確認し、欠損により過食と肥満が進むことを見つけ、大腸EECも食欲調節とかかわることを確認しています。

そのメカニズムを調べる中で、どうやら大腸EECの存在有無により腸内細菌叢が激しく変動すること、その際のグルタミン酸量が大きく変動すること、グルタミン酸投与により大腸EECを介した食欲抑制作用が発揮されることを明らかにしています。

□

グルタミン酸受容体がインフルエンザ感染にかかわる **Nature Microbiology**誌

グルタミン酸受容体mGluR2が、インフルエンザウイルスが細胞内へ侵入・感染する際に利用されていることを明らかにした論文。

タイトルは

Influenza virus uses mGluR2 as an endocytic receptor to enter cells

https://www.nature.com/articles/s41564-024-01713-x

□

インフルエンザウイルスの多くは、クラスリン依存性エンドサイトーシスで細胞内に侵入するそうですが、その際には何らかの細胞側の受容体を認識しているはずですが、どの受容体を介しているかは不明だったようです。

この論文では、その受容体がmGluR2であることを突き止め、同時にpotassium calcium-activated channel subfamily M alpha 1 (KCa1.1)というイオンチャネルも利用することで細胞内に侵入できることを明らかにしています。

mGluR2ノックアウトマウスではインフルエンザウイルスが定着しないという点も興味深いです。

一方で、なぜmGluR2なのか、グルタミン酸と何らかの競合は発生していないのか？ などについても疑問が残りますね。

グルタミンは**CD8+T**細胞の重要なエネルギー源 **Science Advances**誌

最後はグルタミンに関する論文で、グルタミンが免疫細胞のエネルギー源となっていることを報告した論文。

[illegible]

^{13}C metabolite tracing reveals glutamine and acetate as critical in vivo fuels for CD8 T cells

https://www.science.org/doi/10.1126/sciadv.adj1431

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2024[illegible]7[illegible]1[illegible]4[illegible]

[illegible] Nature Microbiology[illegible]

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Dietary fibre directs microbial tryptophan metabolism via metabolic interactions in the gut microbiota

https://www.nature.com/articles/s41564-024-01737-3

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Nature Microbology

Microbial community-scale metabolic modelling predicts personalized short-chain fatty acid production profiles in the human gut

https://www.nature.com/articles/s41564-024-01728-4

MCMM ex vivo

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[illegible] Nature Medicine[illegible]

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Strain-specific gut microbial signatures in type 2 diabetes identified in a cross-cohort analysis of 8,117 metagenomes

https://www.nature.com/articles/s41591-024-03067-7

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[illegible]AI Food Chemistry[illegible]

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Fusing ^{1}H NMR and Raman experimental data for the improvement of wine recognition models

https://www.sciencedirect.com/science/article/pii/S0308814624018958

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Paternal and induced gut microbiota seeding complement mother-to-infant transmission

https://www.cell.com/cell-host-microbe/fulltext/S1931-3128(24)00176-8

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Diet shapes the metabolite profile in the intact human ileum, which affects PYY release

https://www.science.org/doi/10.1126/scitranslmed.adm8132

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[illegible]peptide YY (PYY)[illegible]=[illegible]

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[illegible] Cell Metabolism[illegible]

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Brain responses to intermittent fasting and the healthy living diet in older adults

https://www.sciencedirect.com/science/article/abs/pii/S1550413124002250

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[illegible] JAMA Network Open[illegible]

II[illegible]5:2[illegible]2 [illegible]

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A 5:2 Intermittent Fasting Meal Replacement Diet and Glycemic Control for Adults With Diabetes: The EARLY Randomized Clinical Trial

https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2820237

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[illegible]GPCR[illegible]3[illegible]

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Bitter taste receptor activation by cholesterol and an intracellular tastant

https://www.nature.com/articles/s41586-024-07253-y

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Unsaturated bond recognition leads to biased signal in a fatty acid receptor

https://www.science.org/doi/10.1126/science.add6220

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Orphan receptor GPR158 serves as a metabotropic glycine receptor: mGlyR

https://www.science.org/doi/10.1126/science.add7150

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2024[illegible]6[illegible]24[illegible]4[illegible]

[illegible] Nature Aging [illegible]

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Principal component-based clinical aging clocks identify signatures of healthy aging and targets for clinical intervention

https://www.nature.com/articles/s43587-024-00646-8

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Nanotechnology[illegible]

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Resolvin D1 delivery to lesional macrophages using antioxidative black phosphorus nanosheets for atherosclerosis treatment

https://www.nature.com/articles/s41565-024-01687-1

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Correction of age-associated defects in dendritic cells enables $CD4^{+}$ T cells to eradicate tumors

https://www.cell.com/cell/abstract/S0092-8674(24)00535-X

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[illegible] Nature Communications[illegible]

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Faecal microbiota of schoolchildren is associated with nutritional status and markers of inflammation: a double-blinded cluster-randomized controlled trial using multi-micronutrient fortified rice

https://www.nature.com/articles/s41467-024-49093-4

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Sleep loss diminishes hippocampal reactivation and replay

https://www.nature.com/articles/s41586-024-07538-2

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Dysfunctional circadian clock accelerates cancer metastasis by intestinal microbiota triggering accumulation of myeloid-derived suppressor cells

https://www.cell.com/cell-metabolism/abstract/S1550-4131(24)00172-4

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An unbiased ranking of murine dietary models based on their proximity to human metabolic dysfunction-associated steatotic liver disease (MASLD)

https://www.nature.com/articles/s42255-024-01043-6

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[illegible] Food Chemistry[illegible]

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Real-time monitoring of vegetable oils photo-oxidation kinetics using differential photocalorimetry

https://www.sciencedirect.com/science/article/pii/S0308814624016613

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腸内細菌が性ホルモン代謝にかかわっている驚きの論文3報

エストラジオールを分解し、閉経前女性の鬱発症にかかわる腸内細菌　**Cell Metabolism**誌

閉経前女性のうつ症状発症と関連する腸内細菌*Klebsiella aerogenes*を見つけ、この菌がエストラジオールを分解する酵素を持っていることを明らかにした論文。

タイトルは、

Gut-microbiome-expressed 3β-hydroxysteroid dehydrogenase degrades estradiol and is linked to depression in premenopausal females

https://www.sciencedirect.com/science/article/pii/S1550413123000530

▯

この菌を投与したメスマウスでは血中エストラジオール濃度が下がり、うつ症状が強くなったそうです。また、この菌はうつ症状がある閉経前女性において存在割合が高いそうです。

テストステロンを分解し、男性の鬱症状を促す腸内細菌　**Cell Host & Microbe**誌

先ほどと同じ研究グループからの論文。男性ホルモンの一種テストステロンを変換する腸内細菌*Mycobacterium neoaurum*を見つけ、この菌をマウスに飲ませるとうつ症状が悪化することを明らかにした論文。

タイトルは

3β-Hydroxysteroid dehydrogenase expressed by gut microbes degrades testosterone and is linked to depression in males

https://www.sciencedirect.com/science/article/pii/S1931312822000373

▯

うつ症状を持つ男性においてこの菌の存在割合が高いことも確認しており、この細菌によるテストステロン分解が男性の鬱症状と強く関連

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Gut bacteria convert glucocorticoids into progestins in the presence of hydrogen gas

https://www.sciencedirect.com/science/article/abs/pii/S0092867424005142

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など最新論文4報

この記事では2024年5月下旬~6月上旬に出版された最新論文を4報紹介します。

「キシリトールが心疾患リスクを高めるかも」という、普段ガムを噛んでいる私にはびっくりする論文が登場したほか、インフルエンザウイルスの細胞感染メカニズムに迫った研究や、EPAの有効性に遺伝子多型が絡むことを示したヒト研究の論文、などを紹介します。

※本ブログは、直近で出版された論文の中から、著者が独断と偏見で選択した論文を紹介しています。

2024年6月17日: 最新論文4報

キシリトールが心疾患リスクを高める European Heart Journal誌

キシリトールの摂取が心血管疾患リスクの上昇と関連することを報告した論文。

タイトルは

Xylitol is prothrombotic and associated with cardiovascular risk

https://academic.oup.com/eurheartj/advance-article-abstract/doi/10.1093/eurheartj/ehae244/7683453

□

キシリトールは、砂糖の数千倍の甘みを呈するにも甘味料にもかかわらずカロリーが砂糖より大幅に低いことが知られており、日本では「キシリトールガム」などで特定保健用食品にも利用されている甘味料です。

今回の研究では、キシリトールの摂取量が将来の心疾患リスクの上昇と関連することが報告され、Twitter界隈でも話題になっていました。

□

この研究では、以下のようにコホート研究・動物試験・ヒト介入試験で何度も確認を行っています。

・前向き探索コホートで、心疾患リスクと関連するノンターゲットメタボロミクスを行ったところ、キシリトールが候補として出てきた。

・検証コホートでは、血中キシリトール濃度を測定して情報を追加しつつ、このコホートでも同様の関連がみられた。

・動物試験でキシリトールを摂取させると、血栓形成を促すバイオマーカーの上昇が確認された。

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[illegible] Nature Microbiology[illegible]

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Influenza virus uses mGluR2 as an endocytic receptor to enter cells

https://www.nature.com/articles/s41564-024-01713-x

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[illegible]2[illegible]potassium calcium-activated channel subfamily M alpha 1 (KCa1.1)[illegible]metabotropic glutamate receptor subtype 2 (mGluR2) [illegible]

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***Fatty acid desaturase* insertion-deletion polymorphism rs66698963 predicts colorectal polyp prevention by the *n*-3 fatty acid eicosapentaenoic acid: A secondary analysis of the seAFOod polyp prevention trial**

https://ajcn.nutrition.org/article/S0002-9165(24)00527-6/fulltext

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Modulation of cream cheese physicochemical and functional properties with ultrafiltration and calcium reduction

https://www.sciencedirect.com/science/article/pii/S0308814624016601

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Accelerated biological aging six decades after prenatal famine exposure

https://www.pnas.org/doi/full/10.1073/pnas.2319179121

1944-45 Dutch Famine

DoHaD

58 DNA

DoHaD

Cell Metabolism

sWAT

The browning and mobilization of subcutaneous white adipose tissue supports efficient skin repair

https://www.sciencedirect.com/science/article/abs/pii/S1550413124001815

dermal white adipose tissue

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Processes influencing the toxicity of microplastics ingested through the diet

https://www.sciencedirect.com/science/article/pii/S0308814624015978

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Discovery of antimicrobial peptides in the global microbiome with machine learning

https://www.cell.com/cell/fulltext/S0092-8674(24)00522-1

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Temporal dynamics of the multi-omic response to endurance exercise training

https://www.nature.com/articles/s41586-023-06877-w

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The mitochondrial multi-omic response to exercise training across rat tissues

https://www.cell.com/cell-metabolism/fulltext/S1550-4131(23)00472-2

▯

45個の研究、総勢約1000万人が対象となったこちらのメタアナリシス。健康アウトカムも多岐にわたっており（mortality, cancer, and mental, respiratory, cardiovascular, gastrointestinal, and metabolic health outcomes）データの膨大さに圧倒されます。

結果としては、超加工食品への曝露が増加すると、死亡率、精神疾患、心臓代謝系疾患のリスクが増加することを確認しています。

運動が皮下脂肪の代謝状態に与える影響には性差がある　Nature Metabolism誌

習慣的な運動で皮下白色脂肪組織の代謝がどう変わるか、運動ありorなしラットの各組織を8週間継時的にマルチオミクスした研究。

タイトルは

Sexual dimorphism and the multi-omic response to exercise training in rat subcutaneous white adipose tissue

https://www.nature.com/articles/s42255-023-00959-9

▯

運動の影響に性差があることを見つけています。雄は好気性代謝、雌はインスリンシグナルや脂肪形成で変化があったそうです。

運動による疾患関連遺伝子の発現変化を網羅解析　Nature Communications誌

習慣的に運動させたラットの各組織における疾患関連遺伝子発現への影響を調べた論文。

タイトルは

The impact of exercise on gene regulation in association with complex trait genetics

https://www.nature.com/articles/s41467-024-45966-w

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妊娠前の父親のミトコンドリアの情報が、精子を介して子供の健康に影響する Nature誌

父親のミトコンドリア情報が子どもの健康に影響することを示した衝撃の論文。

タイトルは

Epigenetic inheritance of diet-induced and sperm-borne mitochondrial RNAs

https://www.nature.com/articles/s41586-024-07472-3

□

ご存じの通り、ミトコンドリアは母親から受け継ぎます。しかしこの論文では、父親の食生活などの生活習慣が精子ミトコンドリアのRNAに影響し、これが受精後にepigeneticな作用を発揮することを示しています。

動物試験では、雄マウスに妊娠前に高脂肪食を摂取させると、精子ミトコンドリアtransferRNAに短い断片が多く出現し、この短いRNA断片が受精後に転写調節の作用を発揮した結果、仔の代謝障害につながることを報告しています。

そしてこの論文がすごいのは、ヒトでも同じような事象を見つけたこと。

ヒト男性の精子中の ミトコンドリアtransferRNA断片がその人のBMIと相関しており、妊娠前後の父親の体系が肥満だと生まれてくる子の肥満リスクが 2 倍になることを、ヒト観察研究から明らかにしています。

父親のミトコンドリアの情報が子どもに影響するということだけでも衝撃的ですが、そこに父親の生活習慣も強く関わっているというのはとても驚きでした。

父親になるには、その前の食生活や生活習慣も大事なのかもしれません。

ミトコンドリアを経口摂取し治療に応用できる製剤を開発! Nature Nanotechnology誌

ミトコンドリア移植治療を、経口摂取できる製剤を開発したという論文。

タイトルは、

Oral mitochondrial transplantation using nanomotors to treat ischaemic heart disease

https://www.nature.com/articles/s41565-024-01681-7

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Personalized metabolic whole-body models for newborns and infants predict growth and biomarkers of inherited metabolic diseases

https://www.cell.com/cell-metabolism/fulltext/S1550-4131(24)00182-7

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Mediterranean Diet Adherence and Risk of All-Cause Mortality in Women

https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2819335

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A Gram-negative-selective antibiotic that spares the gut microbiome

https://www.nature.com/articles/s41586-024-07502-0

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[illegible]Lolamicin[illegible]

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[illegible]Cell Host & Microbe[illegible]

[illegible]*Salmonella* Typhimurium[illegible]

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***Salmonella* Typhimurium expansion in the inflamed murine gut is dependent on aspartate derived from ROS-mediated microbiota lysis**

https://www.cell.com/cell-host-microbe/fulltext/S1931-3128(24)00142-2

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^{13}C metabolite tracing reveals glutamine and acetate as critical in vivo fuels for CD8 T cells

https://www.science.org/doi/10.1126/sciadv.adj1431

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A single-blinded, randomized, parallel intervention to evaluate genetics and omics-based personalized nutrition in general population via an e-commerce tool: The PREVENTOMICS e-commerce study

https://ajcn.nutrition.org/article/S0002-9165(24)00515-X/abstract

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Gut bacteria convert glucocorticoids into progestins in the presence of hydrogen gas

https://www.sciencedirect.com/science/article/abs/pii/S0092867424005142

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[illegible] Nature Metabolism

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Interaction between the gut microbiota and colonic enteroendocrine cells regulates host metabolism

https://www.nature.com/articles/s42255-024-01044-5

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[illegible] American Journal of Clinical Nutrition

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このクルクミン摂取が、非アルコール性脂肪肝を改善することを調べ、そのメカニズムに迫ったヒト介入試験。

タイトルは

Curcumin supplementation alleviates hepatic fat content associated with modulation of gut microbiota-dependent bile acid metabolism in patients with non-alcoholic simple fatty liver disease: a randomized controlled trial

https://ajcn.nutrition.org/article/S0002-9165(24)00482-9/abstract

□

24週間500mg/dayの摂取で肝臓脂肪指標だけでなく、各種代謝マーカー（遊離脂肪酸、中性脂肪、空腹時血糖、HbA1c、インスリン）が改善したことを確認しています。かなり強力な結果が出ています。

さらにそのメカニズムにも踏み込み、意外にも腸内細菌Bacteroidesの増加と腸内細菌が分泌するデオキシコール酸の増加にあると考察しています。

朝食や夕食の欠食は、むしろ肥満につながるかも? **American Journal of Clinical Nutrition**

朝食or夕食を抜く習慣がある人は、そうでない人と比べて体重やウェストサイズの推移が異なるかを調べた中国のコホート研究。

タイトルは

Longitudinal associations of skipping breakfast and night eating with 4-year changes in weight and waist circumference among Chinese adults

https://ajcn.nutrition.org/article/S0002-9165(24)00515-X/abstract

□

通常、欠食がある人は摂取カロリーが低くなる傾向があると考えられ、カロリー基準で考えれば太りやすいというイメージはわかないかもしれません。

しかし、このコホート研究では、朝食もしくは夕食の欠食が頻繁にある人は、追跡4年間において体重やウエストの増加が早かったそうです。そしてこの結果は、食事の質やエネルギー摂取量で調整しても変わらなかったとのこと。

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[illegible]Nature Communications

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Paternal dietary macronutrient balance and energy intake drive metabolic and behavioral differences among offspring

https://www.nature.com/articles/s41467-024-46782-y

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[illegible]Nature

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Paternal microbiome perturbations impact offspring fitness

https://www.nature.com/articles/s41586-024-07336-w

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[illegible]RNA[illegible]

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[illegible]Nature[illegible]

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Epigenetic inheritance of diet-induced and sperm-borne mitochondrial RNAs

https://www.nature.com/articles/s41586-024-07472-3

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[illegible]RNA[illegible]epigenetic[illegible]

[illegible]transferRNA[illegible]RNA[illegible]

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[illegible]4[illegible]20240531

[illegible] Nature Metabolism[illegible]

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Quantitative analysis of metabolic fluxes in brown fat and skeletal muscle during thermogenesis

https://www.nature.com/articles/s42255-023-00825-8

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[illegible]Nature Communications[illegible]

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Senescent immune cells accumulation promotes brown adipose tissue dysfunction during aging

https://www.nature.com/articles/s41467-023-38842-6

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[illegible]S100A8[illegible]S100A8[illegible]

[illegible]

[illegible]Cell Reports Medicine[illegible]

[illegible]or[illegible]

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Gut microbiome modified by bariatric surgery improves insulin sensitivity and correlates with increased brown fat activity and energy expenditure

https://www.sciencedirect.com/science/article/pii/S2666379123001659

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[illegible]Cell[illegible]

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BCAA-nitrogen flux in brown fat controls metabolic health independent of thermogenesis

https://www.cell.com/cell/fulltext/S0092-8674(24)00346-5

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[illegible] Nature Communications

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Antioxidant hepatic lipid metabolism can be promoted by orally administered inorganic nanoparticles

https://www.nature.com/articles/s41467-023-39423-3

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[illegible]Nature Nanotechnology

[illegible]Bifidobacterium longum[illegible]B.longum[illegible]

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Artificial-enzymes-armed *Bifidobacterium longum* probiotics for

alleviating intestinal inflammation and microbiota dysbiosis

https://www.nature.com/articles/s41565-023-01346-x

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Single-site iron-anchored amyloid hydrogels as catalytic platforms for alcohol detoxification

https://www.nature.com/articles/s41565-024-01657-7

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2024[illegible]5[illegible]27[illegible]GDF15[illegible]5[illegible]

Growth Differentiation Factor-15[illegible]GDF15[illegible]

[illegible]GDF15[illegible]

[illegible]GDF15[illegible]GDF15[illegible]

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[illegible]GDF15[illegible]5[illegible]

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GDF15[illegible]5[illegible]20240527

GDF15[illegible]Nature

[illegible]2023[illegible]Nature[illegible]

GDF15[illegible]NASH[illegible]

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GDF15 promotes weight loss by enhancing energy expenditure in

muscle

https://www.nature.com/articles/s41586-023-06249-4

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□GDF15□GFRAL□glial-cell-derived neurotrophic factor family receptor α-like□□□□□□□□□□□□□□□□□□□□□□

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□GFRAL-β □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

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GDF15 enhances body weight and adiposity reduction in obese mice by leveraging the leptin pathway

https://www.cell.com/cell-metabolism/abstract/S1550-4131(23)00219-X

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Metabolism

GDF15で痩せる人と痩せない人の間で、インスリンに対する応答性が全く異なっていることを明らかにした論文。

タイトルは

GDF15 increases insulin action in the liver and adipose tissue via a β-adrenergic receptor-mediated mechanism

https://www.sciencedirect.com/science/article/abs/pii/S1550413123002267

□

この論文での主張は、「GDF15で体重減少するとインスリン抵抗性が増加してしまうけど、体重が減らない場合はインスリン感受性が改善するよ」という趣旨と思われます。

メカニズムの一つとして、後脳に発現しているGDF15　受容体のGFRAL（glial cell line-derived neurotrophic factor (GDNF) family receptor alpha-like ）と、肝臓と脂肪組織に発現しているβアドレナリン受容体を介したシグナルが関与することを明らかにしています。

ガン腫瘍が分泌するGDF15は、抗PD-1療法の有効性を下げる　Nature Communications

腫瘍が分泌するGDF15はT細胞の腫瘍への遊走を阻害し、チェックポイント遮断療法の有効性を下げてしまうことを、動物試験で確認した論文。

タイトルは

Tumor-derived GDF-15 blocks LFA-1 dependent T cell recruitment and suppresses responses to anti-PD-1 treatment

https://www.nature.com/articles/s41467-023-39817-3

□

GDF15の中和抗体を投与することでT細胞のリクルートや抗PD-1療法の有効性が大きく改善したそうです。

GDF15はガンに関連する食欲不振などにも関連しているらしく、ガン発症後のGDF15の制御がその予後に大きく関わる可能性を示唆しています。

GDF15[illegible]Nature

[illegible]2023[illegible]

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GDF15 linked to maternal risk of nausea and vomiting during pregnancy

https://www.nature.com/articles/s41586-023-06921-9

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