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天文学Astronomy

Evidence for the first globular cluster stellar stream beyond the Milky Way

银河系外首个球状星团恒星流的证据

▲ 作者：Julie Kiel Holm, Sarah Pearson et al.

▲链接：

<https://www.nature.com/articles/s41586-026-10878-w>

▲摘要：

研究者呈现了首个银河系外球状星团恒星流的证据。该恒星流在超漫星系UGC 9050-Dw1的深场哈勃空间望远镜成像中被识别出来。

该恒星流的形态、颜色及其与一个致密源的明显关联，在观测上支持其球状星团前身星的解释，同时利用模拟的球状星团恒星种群再现了观测到的表面亮度。

研究者使用生成式恒星流建模——该模型直接将动力学模型拟合到恒星流的形态上——来约束前身星的质量，并首次提出了针对超漫星系的基于恒星流的晕约束。

恒星流模型指向一个球状星团起源，并暗示其宿主暗物质晕质量较大。通过将球状星团恒星流分析的覆盖范围扩展至河外星系，这项工作作为暗物质科学研究开启了新篇章。

▲ Abstract：

Here we present evidence for the first, to our knowledge, extragalactic GC stellar stream, identified in deep Hubble Space Telescope (HST) imaging of the UDG UGC9050-Dw1. The stream's morphology, colour and apparent association with a compact source support the GC progenitor interpretation observationally and we reproduce the observed surface brightness with simulated GC stellar populations. We use generative stream modelling, which fits dynamical models directly to the stream morphology, to constrain the mass of the progenitor and present the first stream-based halo constraint for an UDG. The stream models point to a GC origin and suggest a massive dark matter host halo. By extending the reach of GC stream analysis to external galaxies, this work opens a new chapter in dark matter science.

医学Medicine

Dual tumour – myeloid targeting of glioblastoma with GPNMB CAR-T cells

GPNMB CAR-T细胞对胶质母细胞瘤的双重肿瘤—髓系靶向

▲作者：Neil Savage, Shan Grewal et al.

▲链接：

<https://www.nature.com/articles/s41586-026-10641-1>

▲摘要：

研究者利用多组学靶点发现平台，鉴定出GPNMB是胶质母细胞瘤中的一个双区室抗原。

抗GPNMB CAR-T细胞在原位患者来源异种移植模型和同源胶质瘤模型中显示出强效抗肿瘤活性，通过同时清除GPNMB+肿瘤细胞和免疫抑制性髓系细胞群体，实现了长期疾病控制。

通过整合肿瘤控制与微环境重编程，这些发现为异质性高、髓系细胞丰富的实体瘤提供了一种新的抗原选择与靶向策略。

▲ Abstract :

Here we use a multi-omic target discovery platform to identify GPNMB as a dual-compartment antigen in glioblastoma. Anti-GPNMB CAR-T cells showed potent anti-tumour activity, with long-term disease control in orthotopic patient-derived xenografts and syngeneic glioma models through concomitant depletion of GPNMB+ tumour and immunosuppressive myeloid populations. By collapsing tumour control and microenvironmental reprogramming, these findings provide a new strategy for antigen selection and targeting in heterogenous, myeloid-rich solid cancers.

De novo design of miniproteins targeting GPCRs

从头设计靶向G蛋白偶联受体的微型蛋白

▲ 作者：Edin Muratspahi?, David Feldman et al.

▲ 链接：

<https://www.nature.com/articles/s41586-026-10656-8>

▲ 摘要：

研究者在此描述了用于生成具有高亲和力、高效力和高选择性的G 蛋白偶联受体（GPCR）结合微型蛋白的从头设计方法，以及一种基于受体分流的高通量显微筛选平台。

研究者设计了能激活瘙痒和疼痛相关受体的微型蛋白激动剂，也设计了能抑制癌症、糖尿病和肥胖等代谢性疾病以及偏头痛相关受体的拮抗剂。

五个受体结合设计的冷冻电镜结构均与计算设计模型高度吻合。一种设计的趋化因子受体拮抗剂在体内动员造血干细胞和祖细胞的效果与临床用药相当，且副作用更少。

▲ Abstract :

Here we describe de novo design methods and a high-throughput receptor-diversion microscopy-based screen for generating GPCR-binding miniproteins with high affinity, potency and selectivity. We design miniprotein agonists that activate receptors involved in itch and pain, as well as antagonists that inhibit receptors implicated in cancer, metabolic disorders such as diabetes and obesity, and migraines. The cryo-electron microscopy (cryo-EM) structures of five receptor-bound designs are close to the computational design models. A designed chemokine receptor antagonist mobilizes haematopoietic stem and progenitor cells in vivo at a level comparable to a clinically used drug, with fewer adverse effects.

地球科学Earth Science

Multiyear tropical warm pool warming drives slowdown in Antarctic mass loss

多年热带暖池升温导致南极质量损失减缓

▲ 作者：Yunhe Wang, Qinghua Ding et al.

▲ 链接：

<https://www.nature.com/articles/s41586-026-10912-x>

▲ 摘要：

研究者表明，近期南极冰盖质量增加与热带暖池海表温度异常驱动的一种重复性大气遥相关有关——相较于前二十年，该区域在2021年至2023年间经历了异常持续的增温。

基于观测和模型实验，研究者发现热带暖池增温激发了一系列向极传播的罗斯贝波列，在东南极上空诱导出高压异常，从而增强了玛丽皇后地和威尔克斯地的降水，并驱动了观测到的质量增加，其水汽主要源自中纬度印度洋。

在观测和历史模拟中，热带暖池类似的多年增温事件约每十年出现一次，其对降水的影响与全球变暖的效应有所不同。

因此，近期南极冰盖的质量增加很可能是暂时的，尚未反映由全球变暖驱动的南极洲持续湿润化趋势。

▲ Abstract：

Here we show that the recent ice mass gain was linked to a recurrent atmospheric teleconnection driven by sea surface temperature anomalies in the tropical warm pool, which experienced unusually persistent warming from 2021 to 2023 relative to the previous two decades. On the basis of observations and model experiments, we find that tropical warm pool warming excites a poleward-propagating Rossby-wave train that induces a high-pressure anomaly over East Antarctica, enhancing Queen Mary Land and Wilkes Land precipitation and driving the observed mass gain, with moisture primarily sourced from the mid-latitude Indian Ocean. Similar multiyear warming in the tropical warm pool recurs about once per decade in observations and historical simulations, and its influence on precipitation is distinct from the effects of global warming. Therefore, the recent Antarctic Ice Sheet mass gain is probably temporary and does not yet reflect a sustained, global-warming-driven moistening of Antarctica.

生物学Biology

A unicellular relative links aggregative multicellularity to animal origins

一种单细胞近缘生物将聚集性多细胞性与动物起源联系起来

▲ 作者：Ruibao Li (黎瑞宝), Jennah E. Dharamshi, Kyle Kwok, Iñaki Ruiz-Trillo Joseph P. Gerdt

▲ 链接：

<https://www.nature.com/articles/s41586-026-10748-5>

▲ 摘要：

研究者探究了另一种与动物亲缘关系密切的单细胞近缘生物是否能够形成聚集。他们发现，海洋中自由生活的噬菌性丝状单胞生物——振动小领鞭毛虫（*Ministeria vibrans*）——能够形成动力学可复现、长期稳定的均质聚集群，且改善摄食和交配可能是这种聚集行为的演化驱动力。

值得注意的是，研究者发现许多在动物多细胞性中涉及细胞粘附、信号传导和转录调控的多细胞基因同源物在聚集过程中被表达，表明这些基因可能在动物多细胞发育中被整合利用之前，已经在其单细胞祖先中用于聚集过程。

因此，这一研究结果与“聚集性多细胞性对动物多细胞遗传工具包的演化至关重要”这一观点相一致。

▲ Abstract：

Here, to fill this gap, we investigated whether an additional close unicellular relative of animals can undergo aggregation. We found that the marine free-living bacterivorous filasterean *Ministeria vibrans* forms homogeneous aggregates with reproducible kinetics that have long-term stability, and that improved feeding and mating may be evolutionary drivers of this aggregation. Notably, we found that homologues of many animal multicellularity genes involved in cell adhesion, signalling and transcriptional regulation were deployed during the aggregation process, indicating that they may have been used for aggregation in the unicellular ancestors of animals before being co-opted into animal multicellular development. Thus, our results are consistent with aggregative multicellularity being key to the evolution of the multicellular animal genetic toolkit.

Ancient feeding-related neuropeptides regulate alloparenting in ants

古老的摄食相关神经肽调控蚂蚁中的异亲抚育行为

▲ 作者：Alexander Paul, Tomas Kay et al.

▲ 链接：

<https://www.nature.com/articles/s41586-026-10747-6>

▲ 摘要：

研究者通过一项针对神经肽的无偏药理学筛选，发现两种古老的摄食调控因子——神经肽F（NP

F) 和咽侧体抑制素A (AstA) ——能够调控克隆突袭蚁中的育幼行为。

通过功能操控实验，研究者证明NPF增强育幼行为，而AstA则产生相反效应。此外，研究者发现蚂蚁脑中的NPF和AstA水平随年龄自然变化，提示这些变化可能是育幼行为随龄改变的基础。

最后，研究者证明，与独居物种一样，NPF和AstA仍对营养状态敏感，而营养状态也相应地影响育幼行为。这些结果表明，进化过程中，祖先用于调控摄食的分子机制被重新利用，以支持合作育幼和与年龄相关的劳动分工。

▲ Abstract :

Here, using an unbiased pharmacological screen of neuropeptides, we show that two ancestral regulators of feeding, neuropeptide F (NPF) and allatostatin A (AstA), modulate brood-care behaviour in the clonal raider ant. Through functional manipulations, we show that NPF increases brood-care behaviour, whereas AstA has the opposite effect. Furthermore, we find that the levels of NPF and AstA in the brain change naturally as ants age, suggesting that these changes underlie the age-related changes in brood-care behaviour. Finally, we show that, as in solitary species, NPF and AstA remain sensitive to nutritional state, and nutritional state affects brood-care behaviour accordingly. Our results reveal that evolution has co-opted molecular mechanisms that regulated feeding ancestrally to enable cooperative brood care and age-associated division of labour.

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