Press Report
March 2019
Virginie

New Results

Comment on this paper

Modular tissue-specific regulation of *doublesex* underpins sexually dimorphic development in *Drosophila*

Gavin R. Rice, Olga Barmina, David Luecke, Kevin Hu, Michelle Arbeitman, Artyom Kopp

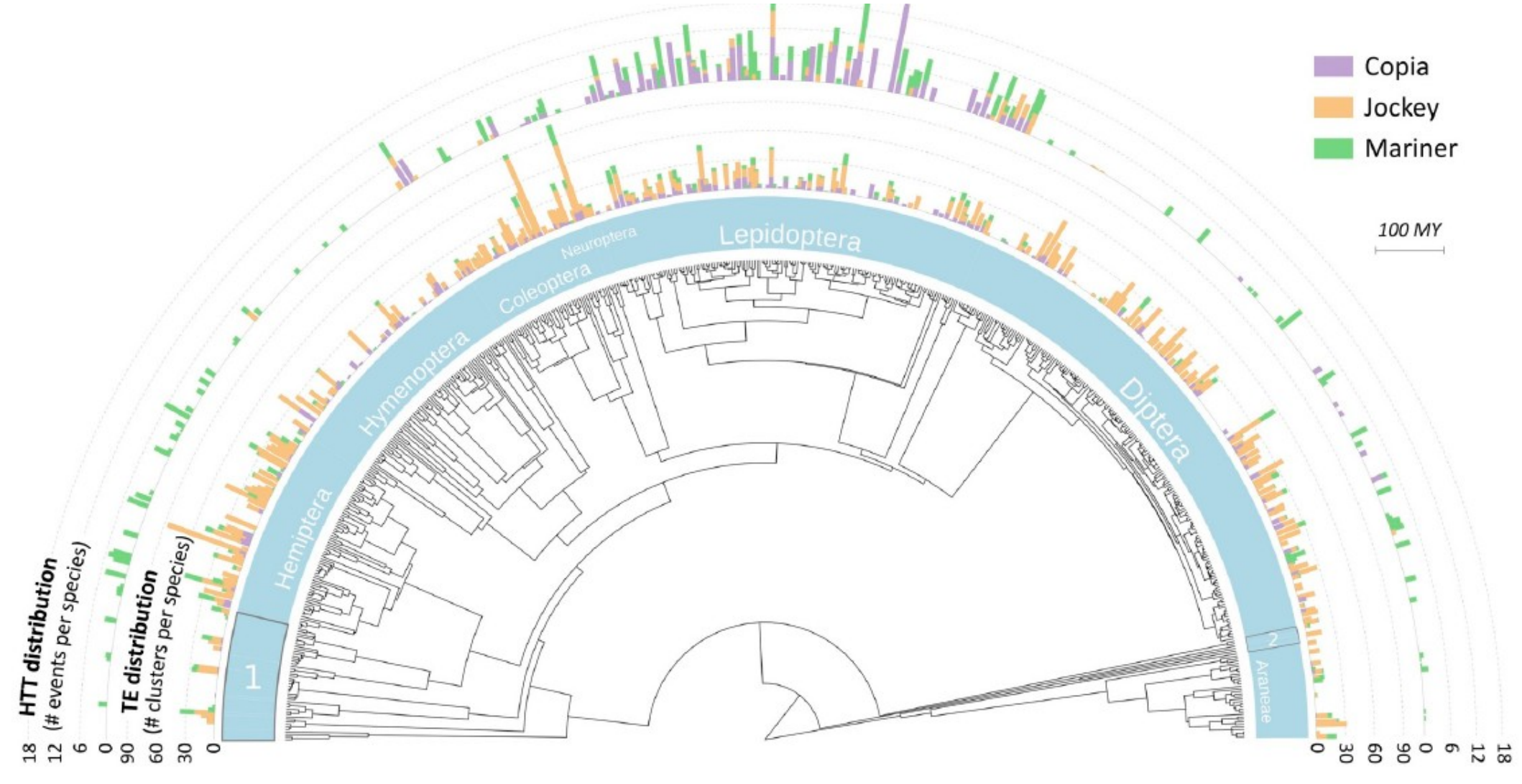
doi: https://doi.org/10.1101/585158

We find that separate modular enhancers are responsible for dsx expression in each sexually dimorphic organ. Expression of dsx in the sex comb is co-regulated by two enhancers with distinct spatial and temporal specificities that are separated by a genitalia-specific enhancer. Thus, the mosaic of sexually dimorphic and monomorphic organs depends on modular regulation of dsx transcription by dedicated cell type-specific enhancers.

RESEARCH ARTICLE

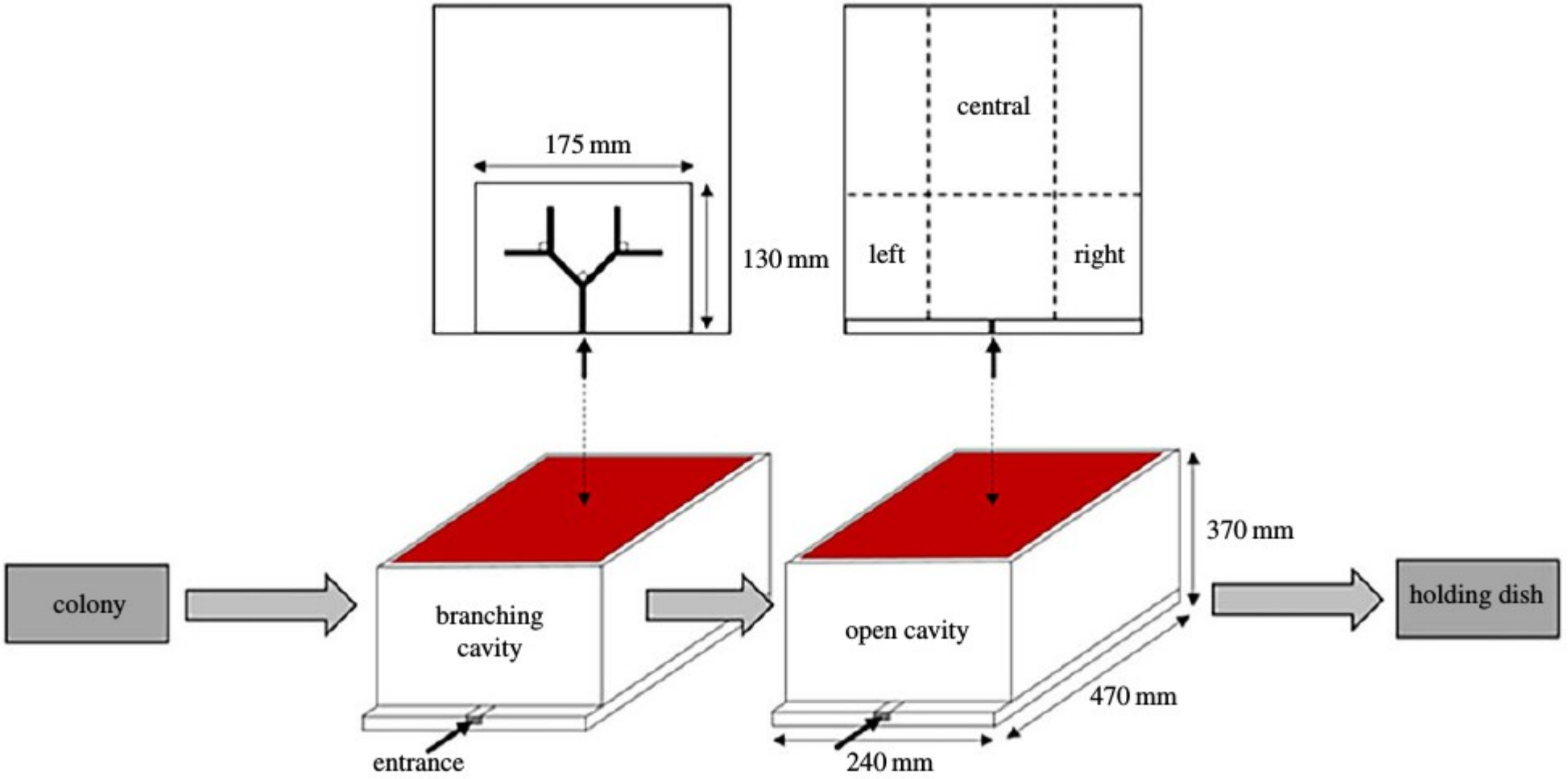
Global survey of mobile DNA horizontal transfer in arthropods reveals Lepidoptera as a prime hotspot

Daphné Reiss[1], Gladys Mialdea[1], Vincent Miele[1], Damien M. de Vienne[1], Jean Peccoud[2], Clément Gilbert[3], Laurent Duret[1], Sylvain Charlat[1]*



Honey bees prefer to turn right when exploring open cavities - their right antenna and eyes are better equipped for sensory investigation

O'Shea-Wheller, T. A. (2019). Honeybees show a context-dependent rightward bias. Biology Letters, 15(2), 20180877.



Dag, U., Lei, Z., Le, J. Q., Wong, A., Bushey, D., & Keleman, K. (2019). Neuronal reactivation during post-learning sleep consolidates long-term memory in Drosophila. eLife, 8, e42786.

Males fruit flies that are repeatedly rejected during courtship subsequently sleep more than control males, which may help them to learn from their experience

Flies that had been subjected to social enrichment, including courtship experience, display an increased amount of day time sleep

Ganguly-Fitzgerald I, Donlea J, Shaw PJ. 2006. Waking experience affects sleep need inDrosophila.Science313:1775–1781.

SCIENCE ROBOTICS | RESEARCH ARTICLE

ANIMAL ROBOTS

Robots mediating interactions between animals for interspecies collective behaviors

Frank Bonnet[1]*, Rob Mills[2], Martina Szopek[3], Sarah Schönwetter-Fuchs[3], José Halloy[4], Stjepan Bogdan[5], Luís Correia[2], Francesco Mondada[1], Thomas Schmickl[3]

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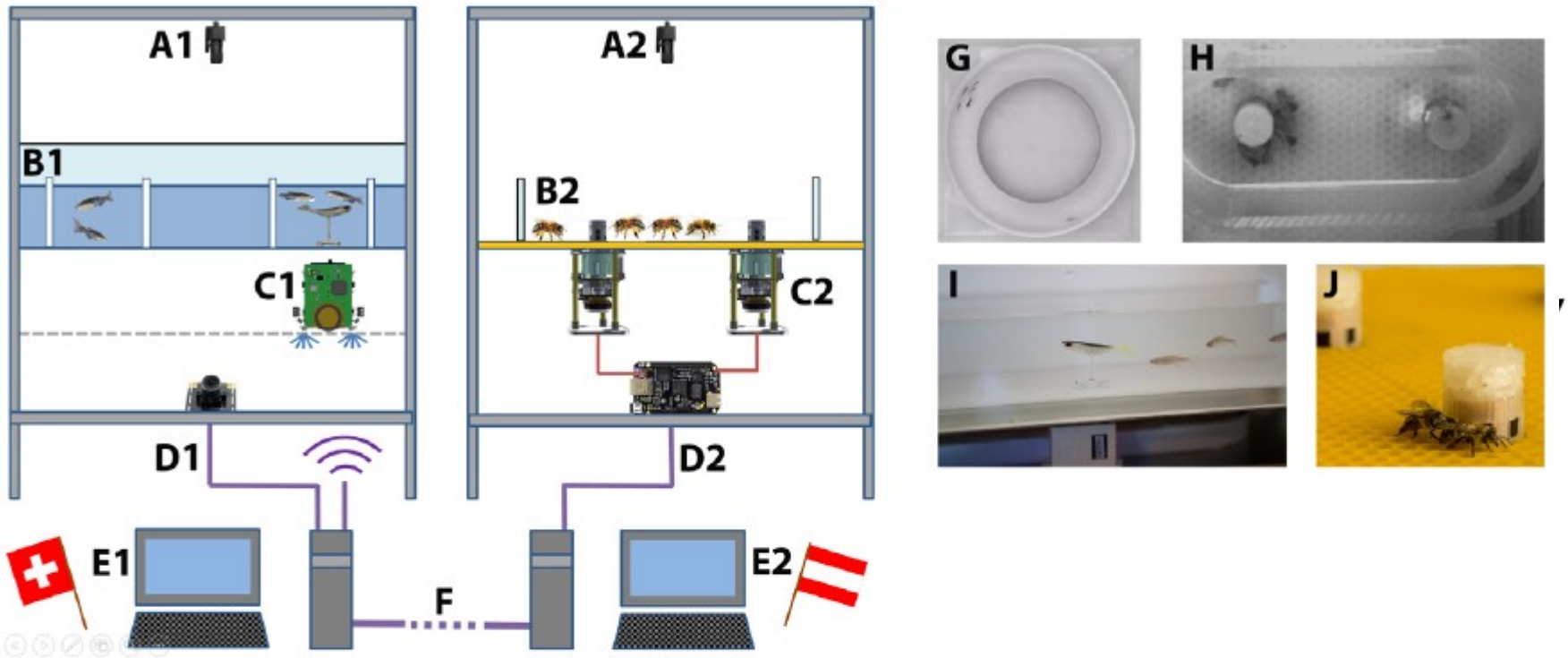


Fig. 1. Automated setup for interspecies experiments composed of two animal species (zebrafish and honeybees) and two artificial devices (fish- and bee-robots). The two setups are composed of a metallic frame, with a camera (**A1** and **A2**) to capture the arenas in high definition. The fish arena (**B1**) includes a tank filled with water and a circular corridor (**G**). This space constrains the zebrafish and lure, presenting a binary choice: The mixed group can move either CW or CCW (G and **I**). Underneath the tank (**C1**), a wheeled mobile robot moved, which also moved its lure via magnetic coupling. The honeybees were contained within a silicon oil–coated Plexiglas arena (**B2**) with two bee-robots, forming a binary choice: The honeybees decided to aggregate around one of these bee-robots (**H**). The "head" of each immobile robot incorporated six IR sensors (**J**). The main bodies were mounted below the arena floor (**C2**) and included a Peltier element to modulate the local temperature inside the arena. The two setups were interfaced (**D1** and **D2**) with computers (**E1** and **E2**) on which programs controlled the robots in a closed loop. The fish setup (in Lausanne, Switzerland) was connected virtually (**F**) to the bee setup (in Graz, Austria)

eLIFE
elifesciences.org

RESEARCH ARTICLE

Synergy and remarkable specificity of antimicrobial peptides in vivo using a systematic knockout approach

Mark Austin Hanson[1]*, Anna Dostálová[1], Camilla Ceroni[1], Mickael Poidevin[2], Shu Kondo[3], Bruno Lemaitre[1]*

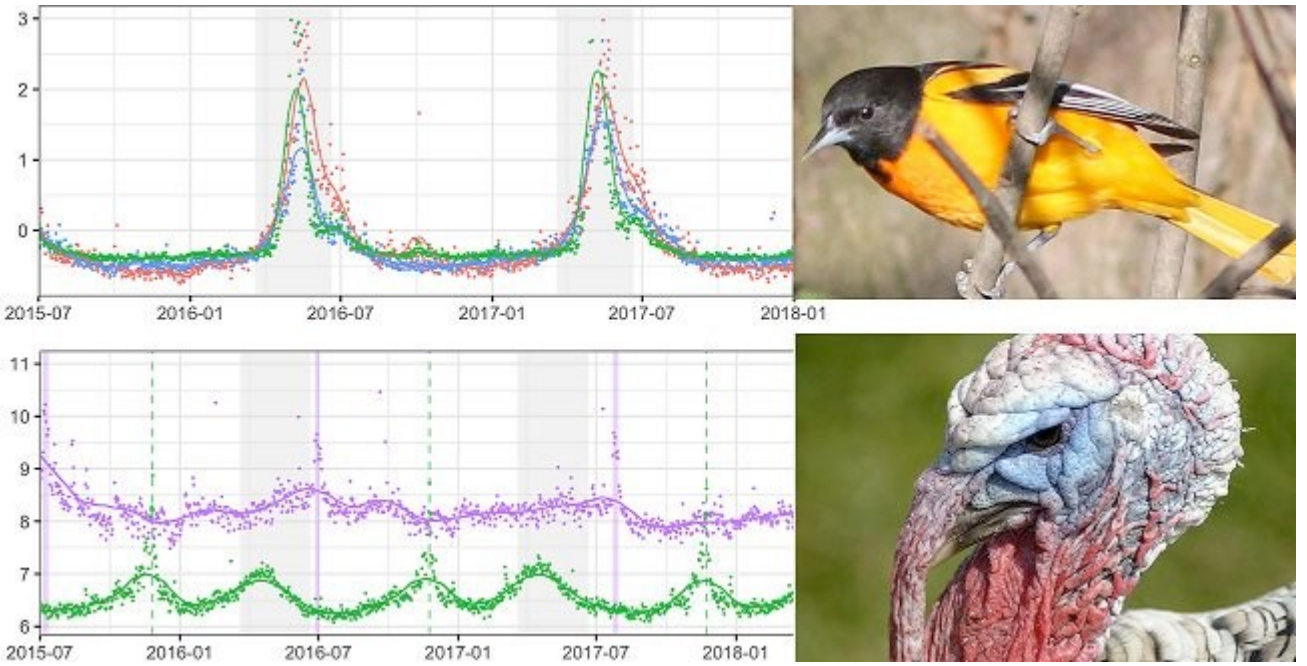
all 14 antimicrobial peptide genes known from fruit flies were removed, and the flies were then infected with a variety of bacteria and fungi. Hanson et al. found that the antimicrobial peptides were effective against many bacteria, but unexpectedly they were far more important for controlling one general kind of bacterial infection, but not another kind. Further experiments showed that some of these proteins work alone, targeting only a particular species of microbe. This finding suggested that animals might fight infections by very specific bacteria with a very specific antimicrobial peptide rather than with a mixture.

CRISPR in Anolis lizards

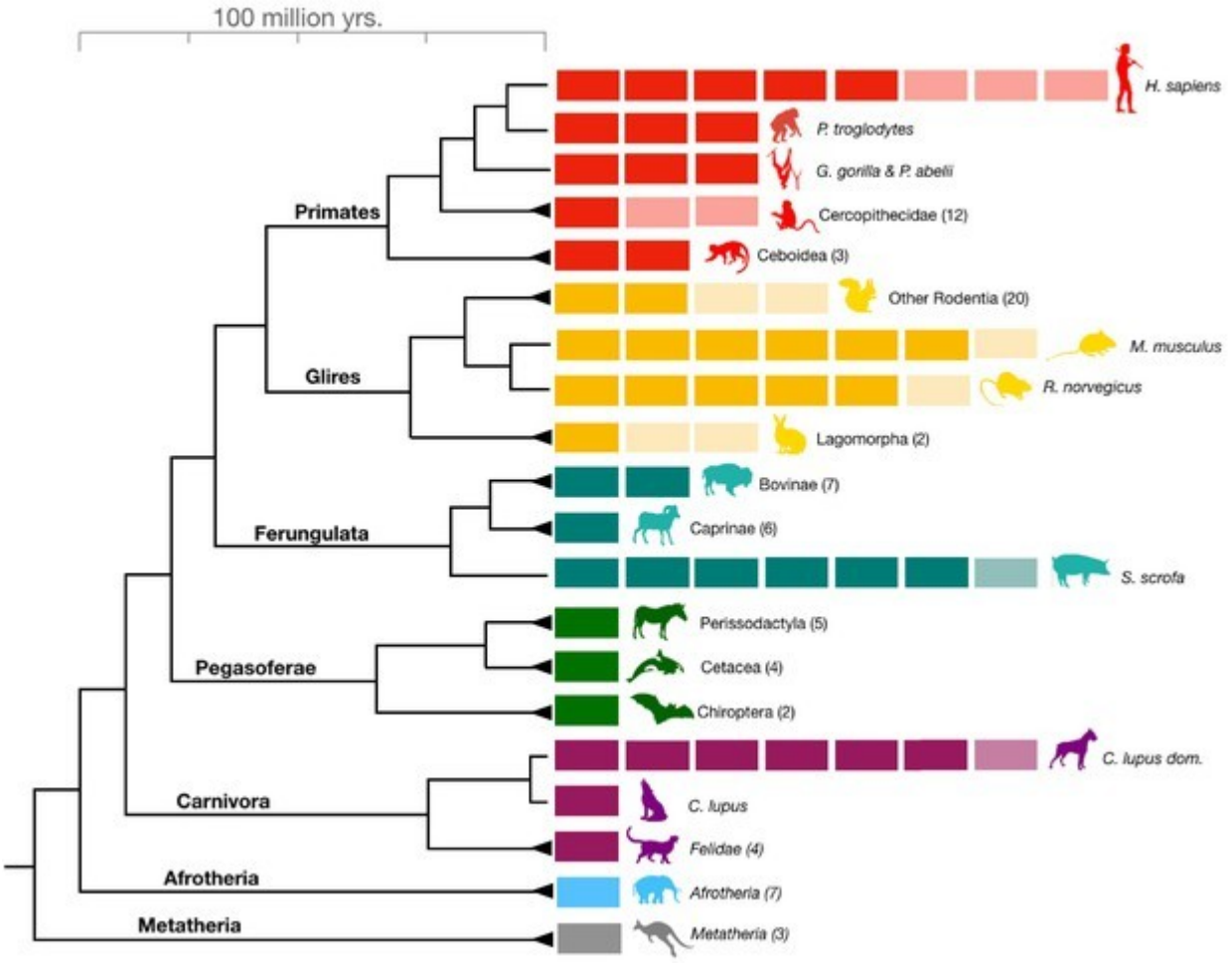
Mittermeier, J. C., Roll, U., Matthews, T. J., & Grenyer, R. (2019). A season for all things: Phenological imprints in Wikipedia usage and their relevance to conservation. PLoS biology, 17(3), e3000146.

Seasonal variation in page-views of Wikipedia animal articles.

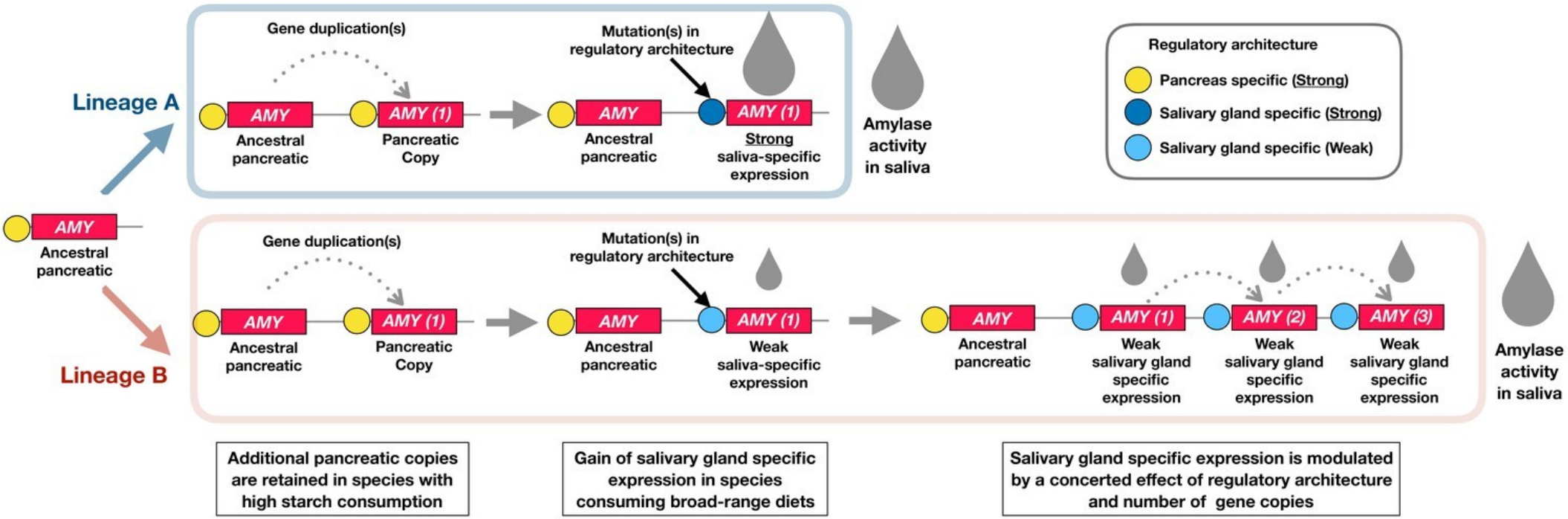
Analysis of >2 billion page-views, 31,751 species, 245 languages, 3 years. >25% of species show a seasonal pattern, some mirroring real-world phenology



Our behavior influences not only our genes but also the genes of our dometicated animals



Independent amylase gene copy number bursts correlate with dietary preferences in mammals. Elife May 2019


Lineage A
Lineage B
AMY
Ancestral pancreatic
Gene duplication(s)
AMY (1)
Pancreatic Copy
Mutation(s) in regulatory architecture
Strong saliva-specific expression
Weak saliva-specific expression
Amylase activity in saliva
Regulatory architecture
Pancreas specific (Strong)
Salivary gland specific (Strong)
Salivary gland specific (Weak)
AMY (2)
AMY (3)
Weak salivary gland specific expression
Additional pancreatic copies are retained in species with high starch consumption
Gain of salivary gland specific expression in species consuming broad-range diets
Salivary gland specific expression is modulated by a concerted effect of regulatory architecture and number of gene copies