Writing a news and views article

Dr Thomas Sainsbury

What is a news and views article?

- A News & Views article is a type of editorial content commonly found in scientific journals - Typically written by experts within the field

- Relatively short: 900-1000 words

- They highlight a particular research finding to the broader scientific community, as well as identifying the impact and any potential limitations/controversies.

The General structure

Title: a short engaging title that summarizes the message of the paper

Abstract: "TL;DR": 1-2 sentences summarizing the paper

Opening paragraph: A short explanation of the problem that the research paper tackles, why is it an interesting problem? This should be written in an engaging style. Try not to use too much technical jargon.

A detailed description of the paper: Introduce the paper and delve into the details of the research, incorporating your own analysis and views. How did the paper tackle the problem? This is often the longest section.

Implications and Future Directions: Conclude with comments on the implications of the new research and potential future directions for further investigation. This is where you as a researcher can really express some of your own views about the paper.

What are its limitations?

What new questions arise from the results of the paper?

What experiments could you do to tackle these questions?

[optional] Figure: Include a figure to illustrate key points or background science. Limit to one figure, which can be reproduced from the selected paper

TITLE

TL;DR

Opening Paragraph

Detail and Explanation

News & Views | Published: 24 September 2019

DECISION-MAKING & MOVEMENT

A new spin on fidgets

Mackenzie Weygandt Mathis

Nature Neuroscience **22**, 1614–1616 (2019) | Cite this article

3302 Accesses | **3** Citations | **69** Altmetric | Metrics

We express decisions through movements, but not all movements matter to the outcome. For example, fidgeting is a common yet 'nonessential' behavior we exhibit. New evidence suggests that this non-task-related movement profoundly shapes neural activity in expert mice performing tasks.

There may be moments in the day when you find yourself fidgeting: while waiting for the subway or sitting in a less-than-thrilling lecture, you may make nonessential movements or play with an object (perhaps an aptly named fidget spinner). Psychologists have ascribed these fidgets to boredom, a form of stress relief, or perhaps as a subconscious way to increase memory[1,2]. We sometimes do this even when we are seemingly actively engaged in a task. For example, you might glance around to find your lab-mates hard at work, yet flipping a pen or tapping their foot. How fidgets modulate their neural activity across the brain remains unclear. We know that certain brain regions drive actions (such as motor cortex) and many others receive this information (such as sensory areas), in part to distinguish self-generated from non-self-generated movements. But how are these movements modulating brain-wide neural dynamics? Could this non-task-related foot tapping be enough to change how predominantly decisions are encoded in the brain?

In this issue of *Nature Neuroscience*, Musall, Kaufman, et al.[3] show that in expert mice performing a task, non-task-related movements dominate the single-trial neural activity (Fig. 1). This is an exciting finding that underlines why measuring behavior and other variables are

References

- The news and views articles are usually limited to **8-15 references**

- **Where to find references?**
  - Often the paper itself will cite a lot of the relevant literature in its introduction this is a good place to start – but also search for other papers that the authors may not have cited!

  - PubMed – search for papers related to the research paper

  - Semantic scholar – gives you succinct summaries of papers

- Use referencing software such as **Zotero** - https://www.zotero.org/

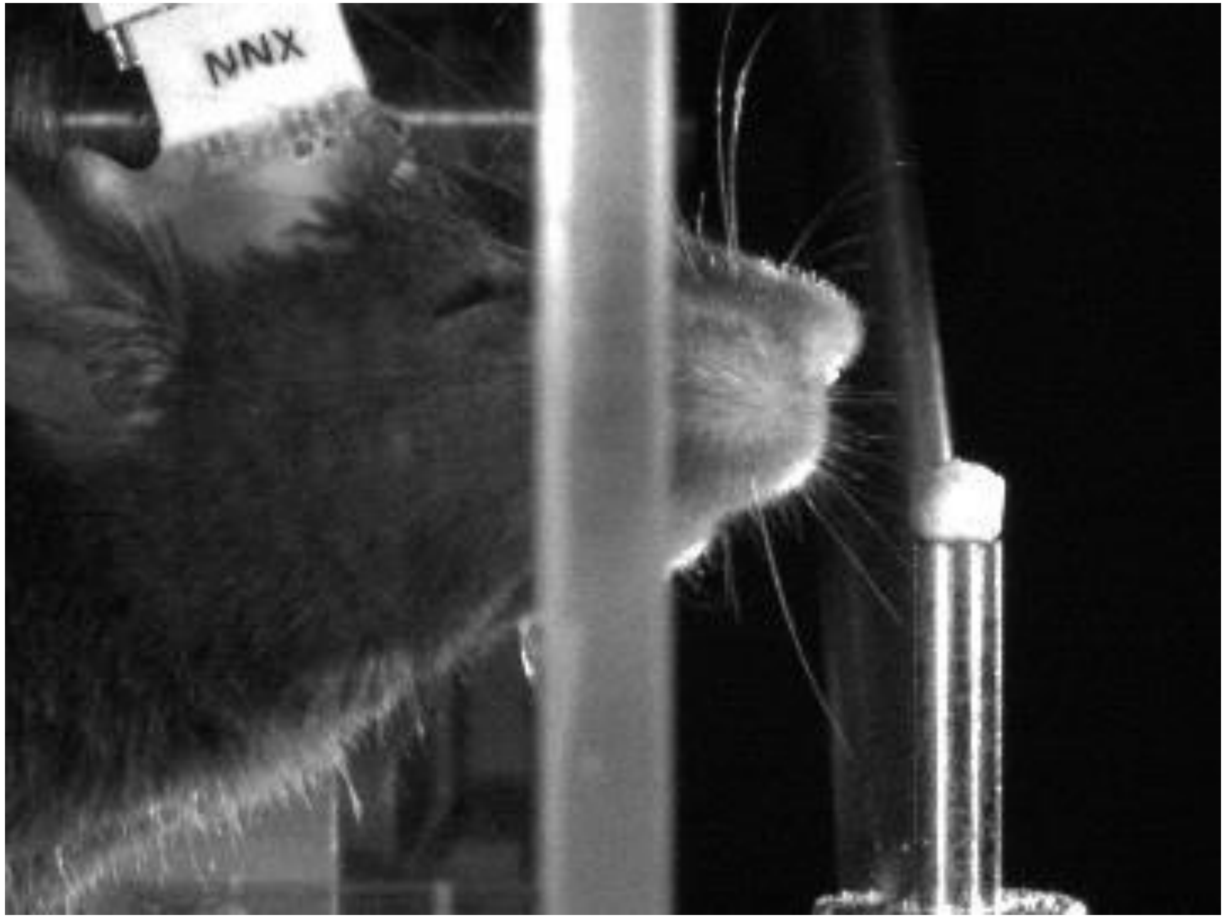
The thought process of writing a news and views

Structural and functional map for forelimb movement phases between cortex and medulla

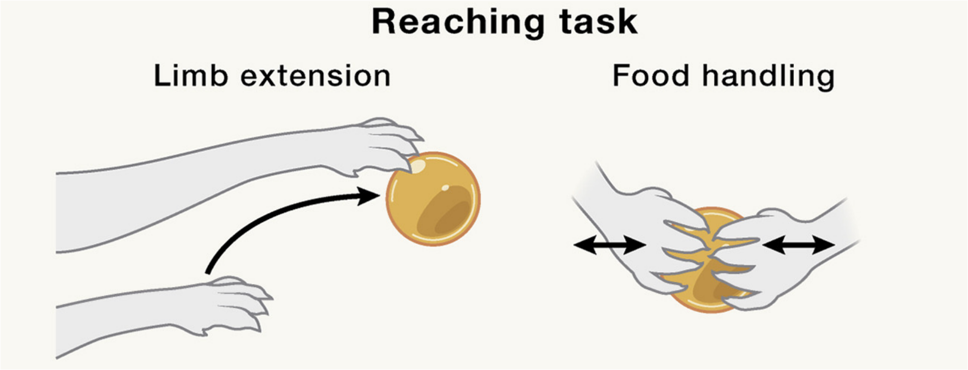
Wuzhou Yang • Harsh Kanodia • Silvia Arber [3] • Show footnotes

Open Access • DOI: https://doi.org/10.1016/j.cell.2022.12.009 • Check for updates

Reaching behaviors



(Bowels et al., 2022)

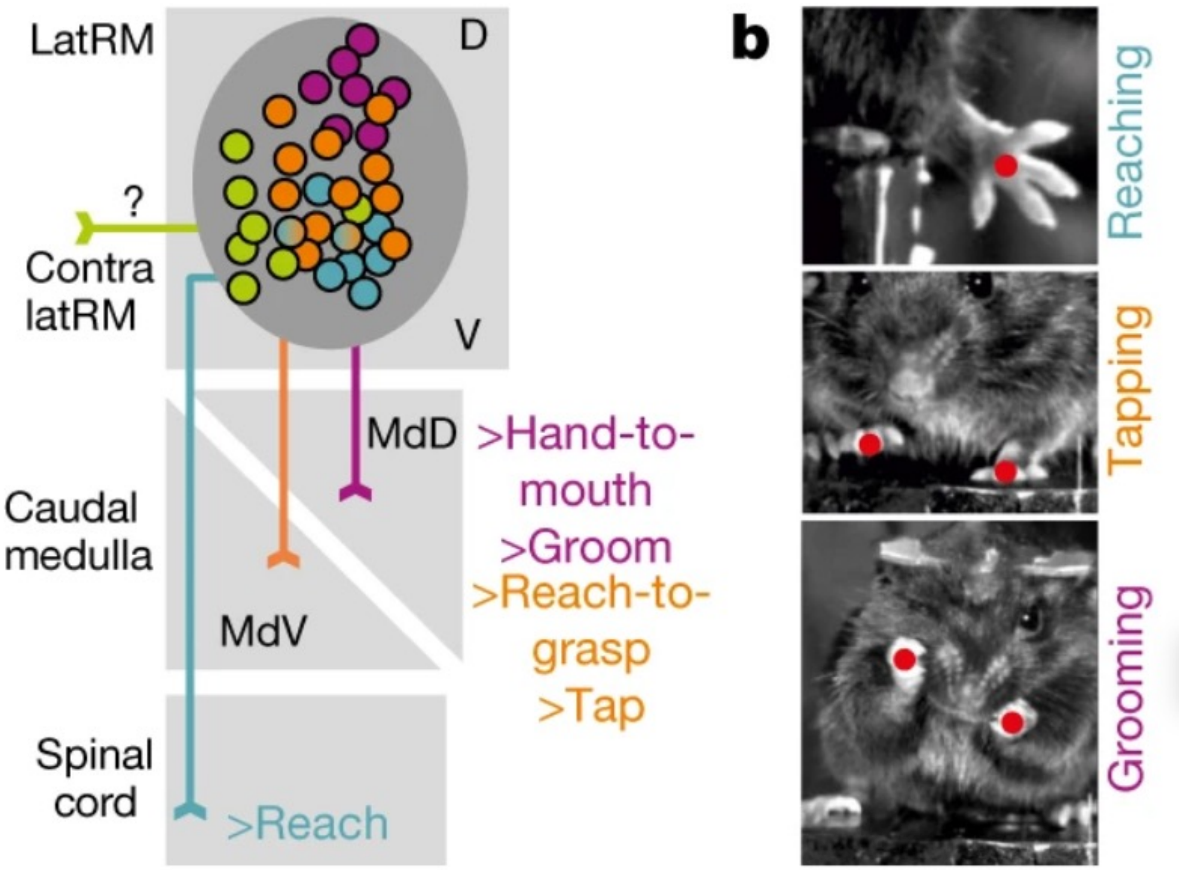


Two distinct phases:

Limb extension and food handling

Brainstem nuclei control different phases of the reach - LatRM

Distinct nuclei control different arm movements



Ventral LatRM - reaching

Stimulation of excitatory RM neurons stratified by projection target

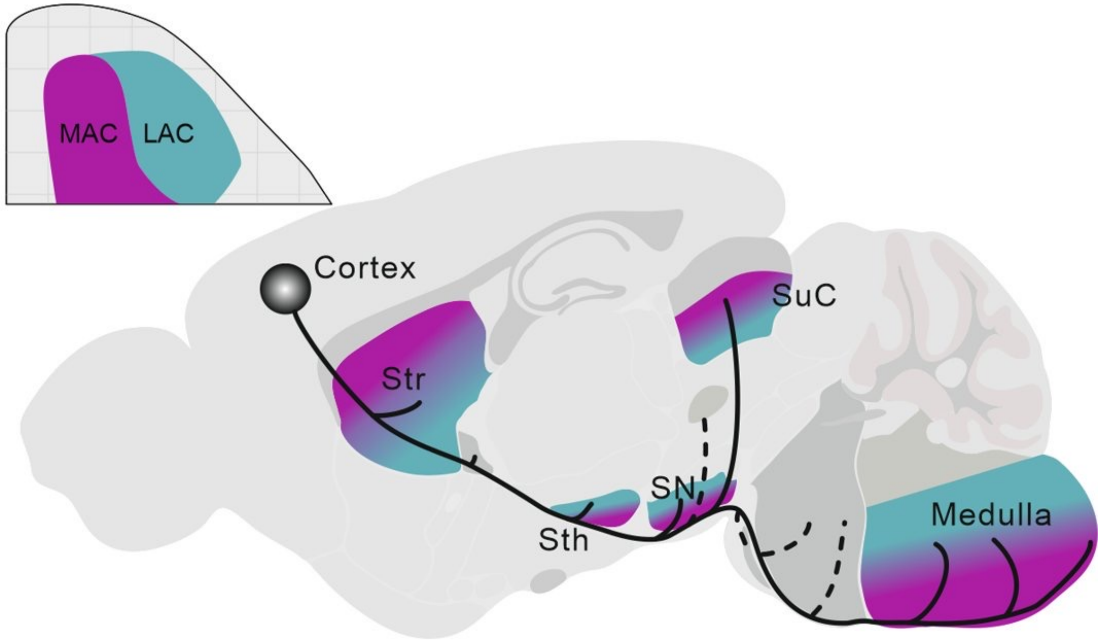
Dorsal LatRM - food handling

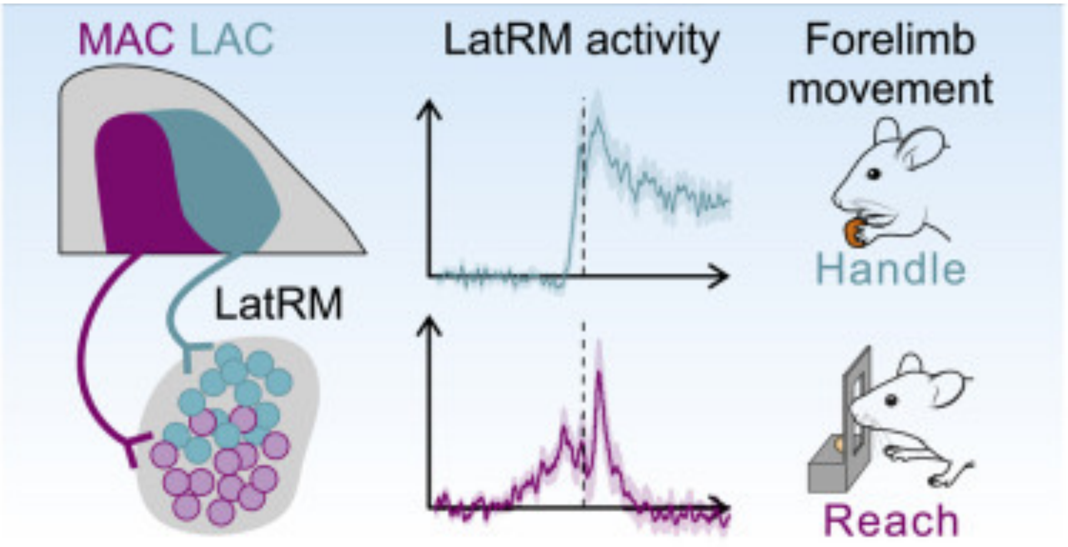
Stimulation of excitatory RM neurons stratified by projection target

(Ruder et al., 2021)

Topographical cortico-medullary connections

Mac = medial anterior cortex
Lac = lateral anterior cortex





Long paper!!! – 35 pages including the supplementary figures

Evolutionary perspective?

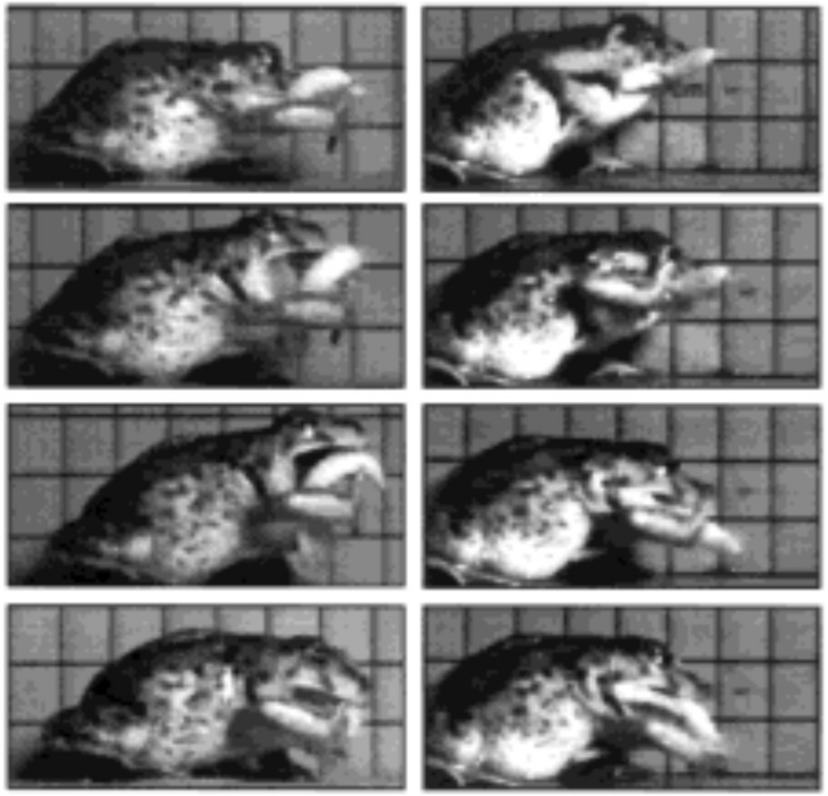
Often when looking at anatomy and new circuits it can be useful to think about that circuit from an evolutionary perspective

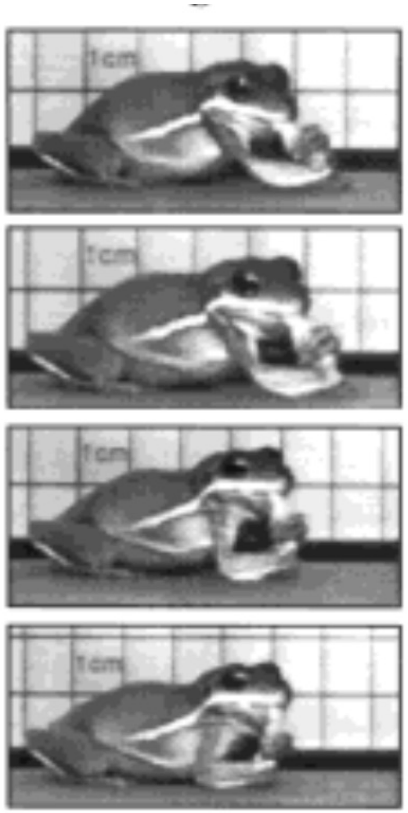
Why did this system evolve?

How is behavior different in animals that don’t have this system?

Are their animals that perform reaching movements that don’t have a cortex?

Frogs also reach – no cortex but have a medulla





Frogs are able to perform reaching movements to pick up grubs and eat them

The frog brain doesn’t have a cortex but do have a medulla

These reaches in frogs are not as skilled as those in mammals and therefore seem to be a primitive of the reaches seen in mammals

so perhaps the cortex has evolved to facilitate dexterous movements for goal directed learning/adaptation

Title

Reaching an understanding of cortico-medullary control of forelimb behaviors

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https://doi.org/10.1016/j.cell.2022.12.011

TL;DR

How the neocortex modulates hindbrain and spinal circuits is of fundamental interest for understanding motor control and adaptive behaviors. New work from Yang, Kanodia, and Arber demonstrates that there is an exquisite anatomical organization and functional modulation from the anterior (motor) cortex on downstream medulla populations during forelimb behaviors in mice.

Opening paragraphs

Why is reaching interesting?

As humans, forearm and hand movements dominate our daily lives. We type on keyboards, hold utensils, shake hands, hug our loved ones, and play sports such as throwing frisbees. It all begins with a reach of the arm and a grasp of the hand. Similarly, rodents such as mice readily climb, reach for and grasp food, and groom themselves with their forelimbs. The ability of mice or humans to perform such actions requires carefully orchestrated movements, with precise activation of individual muscles in temporal sequences, allowing for the generation of both smooth and accurate movements.

The problem

Yet, we still cannot build adaptive robots with the skill and grace of a human, or even a mouse. This is, in part, due to the large gaps in our understanding of the fundamental principles underlying neural circuits that enable such forelimb behaviors. Now, a new paper in *Cell* by Yang, Kanodia, and Arber provides new understanding to a critical piece of the puzzle: how the anterior cortex (M1 and M2) exquisitely orchestrates movements via a hindbrain region called the lateral rostral medulla (latRM).[1] The latRM has been shown to be critical for the motor execution of forelimb movements,[2] but how goal-directed intentions shape its output was unclear.

Paper introduction

Detailed description of the paper

Highlight the questions that they asked

Explain the experiments

Thus, to better understand the role of “top-down” influences on latRM, in an elegant series of experiments, Yang and colleagues labeled neurons projecting from different subregions of the anterior cortex to the latRM (Figure 1). This revealed a striking topography in their axonal termination patterns: neurons in the lateral anterior cortex terminated in the dorsal latRM, whereas medial anterior cortex neurons made their synaptic connections more ventrally.

To understand the functional contribution of these projections, they individually silenced two cortical subregions with muscimol during a pellet-reaching task. In this task, a mouse extended its forelimb to retrieve and consume a food pellet (a process that required bimanual manipulation to eat the food). This experiment revealed that the observed topography in motor cortical projections played distinct roles in the behavior: silencing the medial anterior cortex resulted in the mouse being unable to extend its forelimb, while silencing the lateral anterior cortex rendered the mouse unable to maintain its grasp around the food pellet, dropping it on the floor. These combined observations suggested that these cortical projections might target distinct functional populations within the latRM.

To test this hypothesis, the authors combined *in vivo* electrophysiological recordings of medullary neurons with cortical stimulation via optogenetics. The authors could thus decipher which latRM neurons were receiving input from lateral or medial cortical neurons. Recording from these neurons while the mouse performed the food pellet retrieval task showed that these medullary neurons were behaviorally tuned to either extension of the forelimb or handling of the pellet, complementing their perceived roles during silencing. Together, these results demonstrate that the anterior cortex acts as a high-level controller, recruiting different hindbrain neurons in a temporal sequence and driving distinct phases of forelimb movement.

Interpretation
Our take on the paper

Why did we think this was a cool paper/impactful

How does it fit into the rest of research within the field

This work not only highlights the orchestration of cortex onto latRM;[1] it also provides an important clue into the evolutionary role of this circuit. Namely, when the cortex arose and could control downstream hindbrain regions, this likely allowed for more skilled, learned, and dexterous behaviors. Reaching in rodents is remarkably similar to primates, suggesting that the neural architecture controlling goal-directed forelimb movements may be conserved among mammals.[3,4,5,6]

However, even non-mammalian taxa display a range of forelimb movements, suggesting that their specific use predates the mammalian neocortex. For example, frogs have been found to wipe their faces and “scoop” up prey with their hands.[7] This has led to the suggestion that frogs’ forelimb movements may be a primitive evolutionary precursor to the skilled use of forelimbs observed across many mammalian species.[8] Yet, frogs lack many of the areas associated with mammalian control of movement, including the cortex and corticospinal tract, but they do have a medulla.

The medulla is an ancient (over 500 million years old) region of the hindbrain that is found throughout vertebrate species. While the role of the latRM in forelimb movements of frogs remains unclear,[9] its descending connectivity suggests that it is well positioned as a conserved region for the control of forelimbs. In mice, neurons within the latRM have been found to be recruited specifically during forelimb movements but not locomotion.[2]

Optogenetic activations of different populations of excitatory latRM neurons stratified by axonal targets can produce equally diverse forelimb movements such as reaching followed by grasping, movements of the hand to mouth, and grooming. Thus, while it’s clear that humans are more dexterous than mice, and mice more so than frogs, it is less obvious how the neocortex controls these actions. Undoubtedly, the unrivaled ability of mammals to perform the skilled manipulation of objects with their hands and forelimbs began with the cortical expansion and the newest additions to the motor system. Studies have shown that the anterior cortex is critical for dexterous behaviors of the hand involved in motor learning, yet oftentimes gross movements are spared with lesions.[10] Despite its regular neocortical columnar structure, the anterior cortex shows modularity in its function, and the work by Yang and colleagues further solidifies and extends our understanding of these circuit principles.

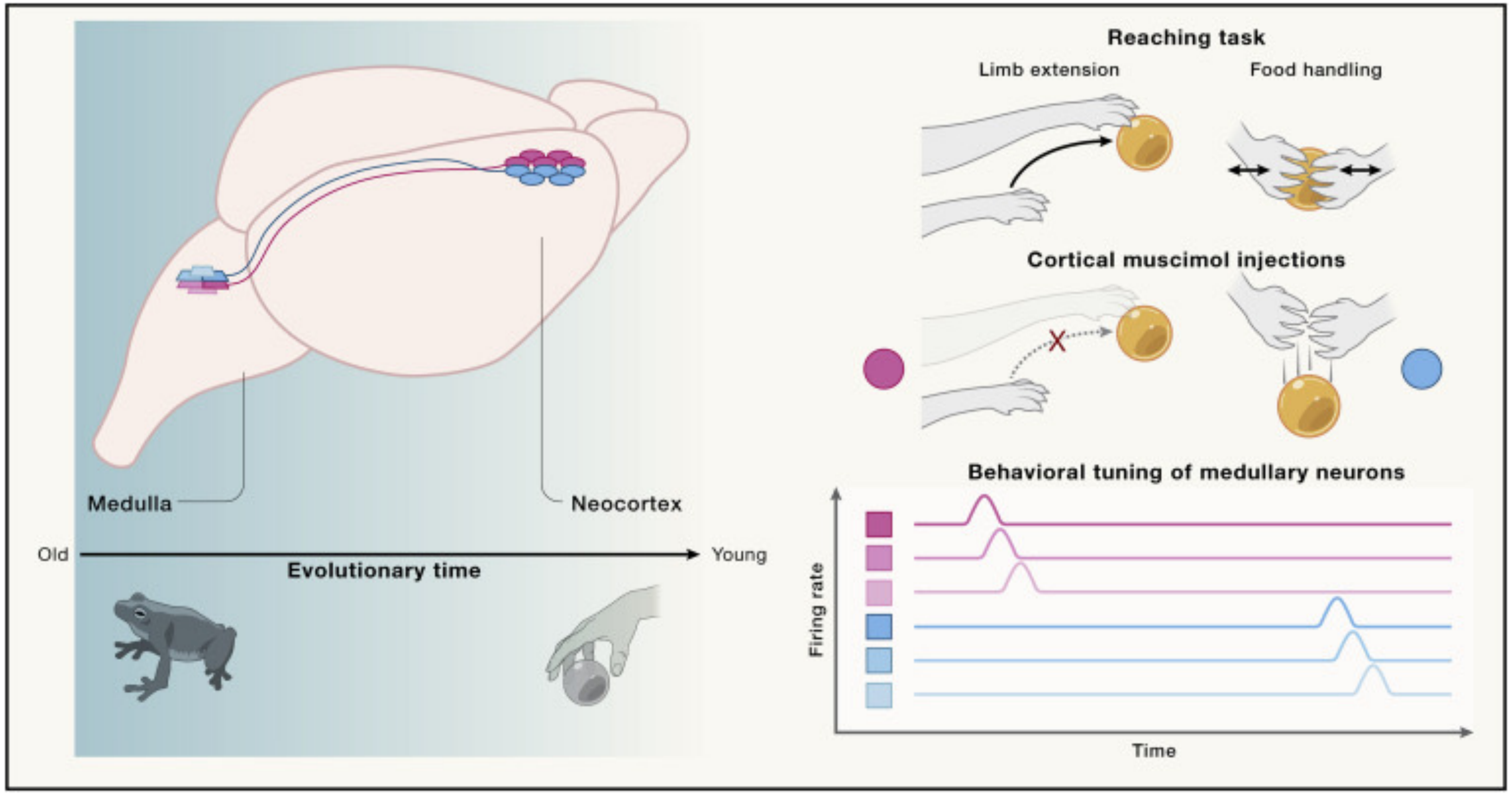
Conclusions/Future
What are the next steps?

What are things that would be interesting to study in future experiments

What are we still missing from the field

Looking forward, it will be of great interest to study the circuit during adaptive learning. It will also be important to consider a global perspective of the cortico-medullary circuit and how it integrates its modulation alongside the cerebellum and basal ganglia.[11] Neurons in the anterior cortex send collaterals to the basal ganglia; therefore, direct and indirect pathways may also have influence over medullary circuits, particularly during learned versus novel skills. For example, there could be rules that govern engagement: the cortical circuits could have the largest influence in shaping flexible adaptive movements, while more habitual forelimb and hand movements could be governed by the basal ganglia. Moreover, how the cerebellar circuits in both smooth movements and rapid learning influence populations of neurons in the hindbrain remains a critical open question. Collectively, studying how hierarchical circuits across the neocortex, basal ganglia, and cerebellum work in concert with the hindbrain to orchestrate learning of actions remains one of the crucial steps toward fully understanding how the old and newly emerged hierarchical circuits enable goal-directed, fine-grained forelimb movements.

The figure



Medulla
Neocortex
Old
Evolutionary time
Young
Reaching task
Limb extension
Food handling
Cortical muscimol injections
Behavioral tuning of medullary neurons
Firing rate
Time

Q and A

Split into pairs and send them a copy of your news and views piece – give feedback back to the other person