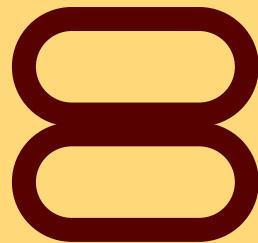
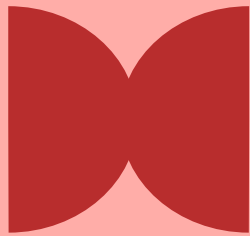


Staying in the Loop

A Biocurator's Guide to Agentic AI Developments



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Berkeley Lab

VIRTUAL BIOCURATION CONFERENCE 2026
WORKSHOP ON ARTIFICIAL INTELLIGENCE IN
BIOCURATION
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Stop using ChatGPT*

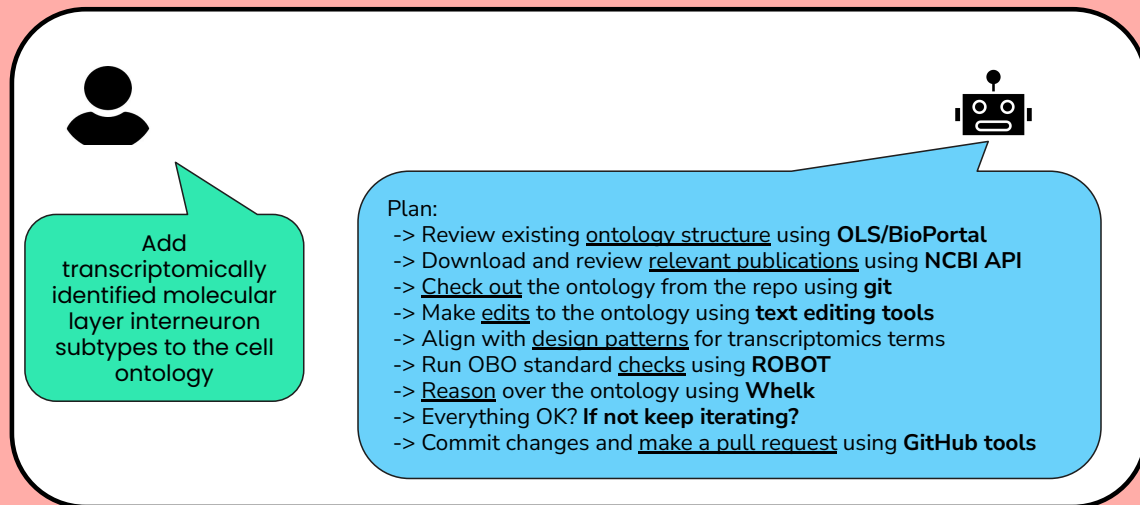
*At least, stop using web chat-only interfaces, to the exclusion of other AI tools

- Most people use AI through web-based chat interfaces
 - E.g. ChatGPT
- If used skillfully, these are useful for some operations
 - Upload files to summarize or extract tables
 - Textbook-level general biological knowledge
- But they are limited (*though less so than before...*)
 - Prone to hallucination, if poorly prompted
 - Limited ability to explore and update your data tables
 - Ability to incorporate latest knowledge from literature is unreliable
 - Lacks context about your motivations or your use case
 - Won't carry out complex end-to-end tasks

Agentic AI marks a paradigm shift

An agent is a program for which you give a task, and it will run a **loop**

- Calling **tools** (e.g. searching databases, pubmed, updating tables)
- Making **LLM prompts**
 - What tool should I use next
 - What do these results mean?
- Managing **state**



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Agents provide an *autonomy dial*

- Different modes for different situations
 - **YOLO**: Run complex end-to-end task without supervision
 - **Plan**: Iterate with human on a plan/spec, then run unsupervised
 - **Handholding**: human checks the results of every step
- This is completely different from outdated 'over-the-wall' NLP/ML
- **Learning how to manage agents is hard but it will be a necessary skill for curators!**



Examples of agentic AI tasks

Plan how to refactor a branch of an ontology, plan migration of existing annotations, execute plan

Review all annotations made by a particular pipeline, read the papers supporting the annotations, make recommendations

Research the mechanistic basis of a disease, survey 100s of papers, build a model that explains individual phenotypes

Review a curated signaling pathway, check it against latest curation guidelines, suggest modifications, survey literature to fill any gaps

Examples of agentic AI tasks

Plan how to refactor a branch of an ontology, plan migration of existing annotations, execute plan

Gradually being adopted by CL, Mondo, Uberon, GO, EFO
<https://ai4curation.io/ai-gene-review/dragon-ai-agent>

Review all annotations made by a particular pipeline, read the papers supporting the annotations, make recommendations

Example:
<https://ai4curation.io/ai-gene-review/pages/projects/SPKW.html>

Research the mechanistic basis of a disease, survey 100s of papers, build a model that explains individual phenotypes

<https://github.com/monarch-initiative/dismech/>

Review a curated signaling pathway, check it against latest curation guidelines, suggest modifications, survey literature to fill any gaps

<https://cmungall.github.io/go-cam-reviews/>

Agents need skilled drivers: The human *out* the loop pattern

Agents *can* perform complex tasks end-to-end

- Example: dragon-ai-agent integrated into ontology github trackers

A better pattern is collaborating with an agent

- Supervising from outside the loop
- **Like managing and onboarding a new team member**

Some practical tips for curators

- **I'm not going to give you:**
 - a "prompting guide"
 - a single workflow you can start using today
- **Instead, I'm going to try and show:**
 - Tools to empower you to learn how to use this technology effectively
 - Ways to think about what is coming ahead

Tip: Dedicate time to learning

- Most curators feel they **don't have time** to learn practical AI skills (or any new skills!)
 - That stack of papers isn't going to curate itself! (yet)



Tip: Dedicate time to learning

- Speak to your PI / supervisor about explicitly carving out time
 - It is vital **for your organization and for you** to carve out the necessary time
 - Your PI/supervisor might agree!
- **Take the time**
 - Both dedicated learning and integrating into day to day work
 - This is **worth the investment many times over**
 - It will be frustrating at first! Persevere!

Stay tuned for learning resources...

Organizational studies show that dedicating time to learning pays off for organizational and for individuals

→ <https://www.cfo.com/news/how-many-learning-days-should-you-offer-employees-metric-of-the-month/654588/>

→ <https://www.shrm.org/topics-tools/topics/learning-development>

Tip: ensure you have access appropriate to your needs

- Don't **waste your precious time** with the free versions of online AI services
 - These are constrained, use weaker models, or have fewer features
 - **You deserve better**
- You need "Pro" level services (ChatGPT, Claude, Gemini) at a minimum
 - Typically ~\$20/mo

You shouldn't have to navigate this

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Tip: ensure you have access appropriate to your needs

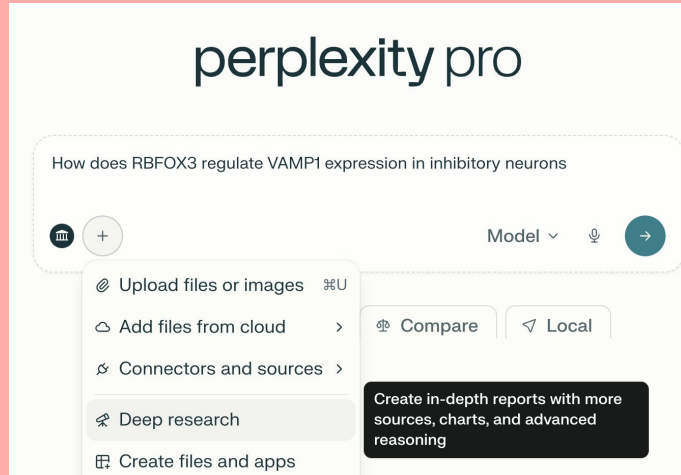
- Ask your supervisor/PI about
 - **Institutional access** (but make sure they are fully featured)
 - **Covering subscriptions** from project funds
 - **Asking AI providers** for academic/research access
 - Failing that: Paying for it themselves
- If you are a supervisor/PI
 - **Figuring this out is your top priority**

Tip: use deep research

- What is Deep Research?
 - Agentic iterative search over the web (including databases, pubmed, ...)
 - Like having an army of research assistants
 - Produces a report to your specification
 - E.g - research a disease, gene, pathway, disease mechanism, ...
- Multiple different options
 - perplexity.ai
 - FutureHouse Edison (generous quotas for academics)
 - <https://platform.edisonscientific.com/>
 - ChatGPT "deep research" mode
 - [Claude.ai](https://claude.ai) "Research" mode
 - Gemini "Research" mode
 - Note: Often only available for Pro subscribers

Further reading: Slide 163 → 176 in [GO AI Workshop](#)

Example



<https://www.perplexity.ai/search/mechanistic-basis-of-rbfox3-in-7zf6mJXbS.C84XTadPuYqw>

How does RBFOX3 regulate VAMP1 expression in inhibitory neurons

Perplexity Sources · 16 Steps

Neuron

Rbfox1 Regulates Synaptic Transmission Through the ...

PubMed

Rbfox1 Regulates Synaptic Transmission through the ...

Proceedings of the Nat...

Neuronal splicing regulator RBFOX3 mediates seizure...

Elife Sciences Publicat...

Rbfox1 up-regulation impairs BDNF-dependent...

RBFOX3 Regulation of VAMP1 Expression in Inhibitory Neurons: Molecular Mechanisms and Functional Consequences

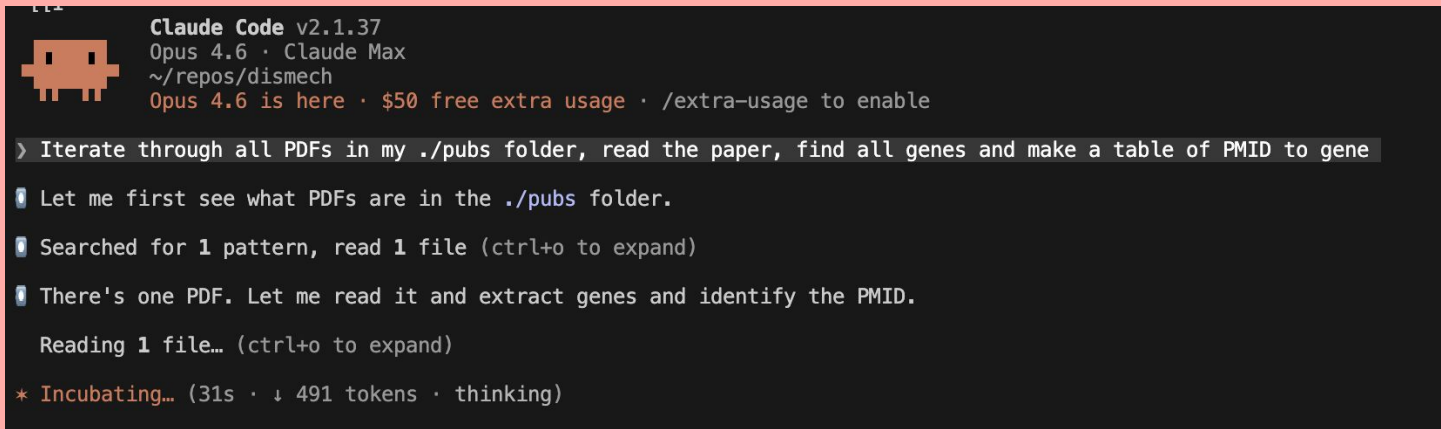
RBFOX3, also known as NeuN (Neuronal Nuclei), is a critical neuronal splicing regulator whose dysregulation has been linked to epilepsy and other neurological disorders. Recent research has revealed a significant mechanistic relationship between RBFOX3 and vesicle-associated membrane protein 1 (VAMP1) in inhibitory neurons, with important implications for neuronal excitability and seizure susceptibility. This report examines the molecular basis of RBFOX3-mediated VAMP1 regulation and its functional consequences in neural circuits.

RBFOX3 and VAMP1: Key Molecular Players in Neuronal Function

RBFOX3 belongs to the RNA-binding Fox (RBFOX) family of proteins, which are established regulators of alternative splicing and mRNA stability in neurons. As a predominantly nuclear protein, RBFOX3 plays crucial roles in neuronal differentiation, maintenance of neural circuitry, and regulation of gene expression patterns that maintain proper brain function. Its deletion or mutation has been associated with epilepsy and other neurological disorders in humans, highlighting its clinical significance.

Tip: learn how to use Claude Code

- Web-based AI interfaces are **inherently constrained** as they lack access to context, tools, and local documents
- Claude Code and similar tools have transformed software development
 - But they are *not just for software*
 - Powerful for any task involving manipulating files or data



```
llm Claude Code v2.1.37
Opus 4.6 · Claude Max
~/repos/dismech
Opus 4.6 is here · $50 free extra usage · /extra-usage to enable

> Iterate through all PDFs in my ./pubs folder, read the paper, find all genes and make a table of PMID to gene

🔍 Let me first see what PDFs are in the ./pubs folder.
🔍 Searched for 1 pattern, read 1 file (ctrl+o to expand)
🔍 There's one PDF. Let me read it and extract genes and identify the PMID.

Reading 1 file... (ctrl+o to expand)

* Incubating... (31s · ↓ 491 tokens · thinking)
```


Tip: learn how to use Claude Code

- This may be pushing the limits of your comfort zone!
 - There are many ways to get help
 - Have a colleague help you with setup
 - Utilize learning resources
 - Use AI to learn

Further learning:

Chris Tabone's 2-part tutorial series in Monarch / OBO Academy:

- <https://oboacademy.github.io/oobook/tutorial/claude-code-getting-started/>
- <https://oboacademy.github.io/oobook/courses/monarch-obo-training/>

For ontology developers:

- ICBO workshop on agentic AI for ontology development
- <https://www.youtube.com/watch?v=9Re39yB7EE>

Tip: Rethink your role

- AI is changing how we work
 - Examples
 - Radiology
 - AI performs first pass interpretation
 - **Demand for radiologists is higher than ever**
 - Software engineering
 - Humans are programming less
 - But we still need to engineer systems
 - **Software engineers increasingly think of themselves as agent managers**
- It is up to us how we re-envision our role moving forward
 - It will involve doing higher level tasks, and more managing and organization

Tip: form a community of practice

- Most people feel “FOMO” about AI, or that they are falling behind
 - Solution: get together and share experiences and support one another
- Join #obo-academy on OBO slack
 - [obofoundry.org](https://obo-foundry.org)
 - <https://obo-communitygroup.slack.com/archives/C02B0FHSCSH>
- Form your own groups with like minded people



Resources

OBO Academy

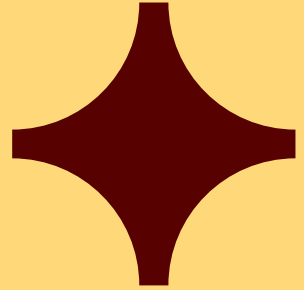
- <https://oboacademy.github.io/oobook/courses/monarch-obo-training/>

GO AI training

- <https://go.lbl.gov/go-ai-workshop>

AI4Curation documentation site

- <http://ai4curation.io/aidocs/>



Thank you!