Updated: April 24, 2023

Neuroscience Affinity Group Process

Process:

The following process, to be refined by the Affinity Group itself, is proposed.

Week	Components	Activity	Goals
-3 03/06/23	Steering Committee	Kick-off meeting	• Define a process to accelerate fundamental discoveries (described below) • Invite colleagues • Serve as facilitators to frame key topics to be considered
-3-0	Steering Committee	Invite colleagues	
1 03/27/23	Steering committee and University representatives	2h virtual meeting	• Define detailed process • Identify topics • Guide discussions - Provide input and feedback • Steering Committee helps implement the decisions of the Affinity Group
		Recruit Neuroscience Affinity Group members	

4 04/17/23	Neuroscience Affinity Group	In-person one day meeting (food and drinks provided)	• Presentation of the Neuroscience Affinity Group
			• Explain process
			• Gather interest across the neuroscience field to cover different levels of neurobiological functions (the broader the better):
			  ○ Molecular
			  ○ Synaptic
			  ○ Circuit
			  ○ Behavior
			  ○ Translational
			• Discuss and prioritize key scientific questions
			• Call for proposals that will be reviewed based on:
			  ○ Impact
			  ○ Cross-discipline interaction
			  ○ Unique fundamental question/answer
			  ○ High-risk/high-reward research
			  ○ Sustainability beyond the award

5-10	Neuroscience Affinity Group	Scientific Teams forming, many based on collisions from the 1-day meeting	
5-10	Neuroscience Affinity Group	Scientific Teams finalizing	• Groups of Scientific Teams form under key defined topics • Outline key questions for their project • Draft proposal: One page • Submit proposal on CBC portal
10 05/30/23		Register Scientific Teams	• Consolidate Scientific Teams formation and categorization
11 06/05/23	Neuroscience Affinity Group	Scientific Teams Report out (virtual meeting 2h)	• Speaker Series - shepherd ideas ○ Report draft proposal **key questions** with 3 slides presentation deck (recorded 5 min pitch) to subgroup in breakout rooms ○ Preliminary idea on first few steps ○ Get feedback from entire Affinity Group • Triage ○ Select most promising proposals via upvoting (if >6 proposals)
13 06/20/23	Neuroscience Affinity Group	Project prioritization (in person- meeting 2h)	• Present a handful of developed ideas (15 min pitch) • Entire Affinity Group votes to prioritize top two to three proposals • All projects continue to be workshopped • 2 to 3 projects will be selected as eligible to receive CBC funding (of up to $250,000 total over two-years to fund a joint postdoc and their experiments) • Intended to provide seed funding for a postdoc developing the Scientific Team's project • Attractive salary and benefits for the joint postdoc on the Scientific Team's project.

- **Week 1:**
  Potential topics to direct the conversation of the Neuroscience Affinity Group:
    - Understand the underpinnings of cerebrovascular diseases[1,2]
        - Can white matter density serve as a biomarker for stroke outcomes?[3]
        - What is the role of endogenous hormones in stroke risk assessment?[4]
        - What are the risks of comorbidity with other neurological conditions (e.g., Parkinson, TBI)?[5]
    - Study the influence of neuroinflammation on neurological disorder, focus on peripheral signaling[6,7]
        - What is the influence of gut-brain axis in neuropsychiatric disorders?[8]
        - What is the role of the HPA axis in inflammatory dysregulations?[9]
        - How do changes in ”metabolic” peptides (e.g., ghrelin, adiponectin, insulin, leptin) affect neuroinflammation?
    - Further define the cellular signaling and organelle dysfunction, especially as it relates to neurodegenerative and neuropsychiatric disorders[10,11,12]
        - How can we better understand the contributions between fast and slow synaptic events to cognition (e.g., neurotransmitters, kinases)?
        - What is the role of receptor trafficking/signaling (e.g., NMDA, extracellular factors)?
        - How do neuronal circuits influence cognition?[13]
    - Integrate genomics/epigenomics into neurological disorders[14]
        - What is the role of epigenetics (e.g., miRNAs, lncRNA, DNA methylation, histone posttranslational modifications) in neuropsychiatric disorders?[15]
        - How do non-coding DNA elements (e.g., enhancers) regulate brain function?[16]
        - How to overlap genetic architecture and genetic variants with neurological disorders?

[1]Kumar A et al. Cerebrovascular disease in women. *Therapeutic Advances in Neurological Disorders*. 2021. doi:10.1177/1756286420985237
[2] Fazekas, et al. Cerebrovascular disorders. *Current Opinion in Neurology*, August 2018. doi:10.1097/WCO.0000000000000566
[3] Chutinet et al. White matter disease as a biomarker for long-term cerebrovascular disease and dementia*. Curr Treat Options Cardiovasc Med*. Mar 2014. doi: 10.1007/s11936-013-0292-z
[4] Bushnell, C. Stroke and the female brain. *Nature Reviews Neurology.* Jan 2008. doi: 10.1038/ncpneuro0686

[5] Lecordier *et al*. Multifocal Cerebral Microinfarcts Modulate Early Alzheimer's Disease Pathology in a Sex-Dependent Manner. *Front Immunol.* Jan 2022. doi: 10.3389/fimmu.2021.813536
[6] Guzman-Martinez *et al.* Neuroinflammation as a Common Feature of Neurodegenerative Disorders. *Front Pharmacol*. Sep 2019. doi: 10.3389/fphar.2019.01008
[7] Rauf *et al*. Neuroinflammatory Markers: Key Indicators in the Pathology of Neurodegenerative Diseases. *Molecules*. May 2022. doi: 10.3390/molecules27103194
[8] Shaik *et al*. Gut-Brain Axis and its Neuro-Psychiatric Effects: A Narrative Review. *Cureus*. Oct 2020. doi: 10.7759/cureus.11131
[9] Tapp *et al*. A Tilted Axis: Maladaptive Inflammation and HPA Axis Dysfunction Contribute to Consequences of TBI*. Front Neurol*. Apr 2019. doi: 10.3389/fneur.2019.00345
[10] Goldstein, D. How does homeostasis happen? Integrative physiological, systems biological, and evolutionary perspectives. *Am J Physiol Regul Integr Comp Physiol*. Apr 2019. doi: 10.1152/ajpregu.00396.2018
[11] Golpich *et al*. Mitochondrial Dysfunction and Biogenesis in Neurodegenerative diseases: Pathogenesis and Treatment. *CNS Neurosci Ther*. Jan 2017. doi: 10.1111/cns.12655
[12] Koh *et al.* Lysosomal dysfunction in proteinopathic neurodegenerative disorders: possible therapeutic roles of cAMP and zinc. *Mol Brain*. Mar 2019. doi: 10.1186/s13041-019-0439-2
[13] Pulvermüller *et al*. Thinking in circuits: toward neurobiological explanation in cognitive neuroscience. *Biol Cybern*. Oct 2014. doi: 10.1007/s00422-014-0603-9
[14] Lee *et al*. The molecular and cellular biology of enhanced cognition. *Nat Rev Neurosci.* Feb 2009. doi: 10.1038/nrn2572
[15] Szulwach *et al.* 5-hmC–mediated epigenetic dynamics during postnatal neurodevelopment and aging. *Nat Neurosci*. Oct 2011. doi: 10.1038/nn.2959
[16] Medico-Salsench *et al*. The non-coding genome in genetic brain disorders: new targets for therapy? *Essays Biochem.* Oct 2021. doi: 10.1042/EBC20200121

- **Week 4:**
  9:00 AM Welcome – introduction and Affinity group overview + invite Alzheimer association and other associations (+ Daniel Abrams (Scialog/Nico) Jodi Johnson (Scientific Director and the Basic Research Program Coordinator for the Lurie Cancer Center)

  The **Affinity Groups** will:
  - Engage multidisciplinary collaborations among researchers.
  - Build on orthogonal expertise to advance fundamental neuroscience questions.
  - Develop a novel approach to advance attractive scientific projects.
  - Accelerate high-risk/high-reward research.

  9:30 AM Research Core Facilities presentations
  - Center for Advanced Microscopy (NU) - Accepted
  - Cytometry and Antibody Technology Core Facility (UC)
  - Genome Research Core (UIC) - Accepted
  - SHyNE Nanotechnology Resource (NU/UC) – Accepted

  10:10 AM Kavli Foundation

  10:20 AM Coffee break

  10:40 AM American Parkinson's Association

  10:50 AM Directions for breakout rooms topics/subtopics
  - Discuss priority research areas
  - Identify key scientific questions for which a collaborative work would greatly advance the scientific understanding

  11:05 AM Breakout rooms to identify key scientific questions

  12:20 PM Report out

  1:20 PM Lunch

  2:20 PM Alzheimer's Association

  2:30 PM Refine key scientific questions

  3:30 PM Debrief

  4:15 PM Conclusion

  4:30 PM Refreshments

- **Week 11:**
  Report out – The individual **Scientific Teams** will report a draft of their proposal by presenting the key questions of their project in Break-out rooms divided by topic (5-minute pitch of novel cutting-edge projects). The sub-group of the Affinity Group will use an online portal provided by the CBC to select the most promising Scientific teams' proposals via upvoting. The top 2 selected projects from each Breakout room will then be presented to the entire Neuroscience Affinity Group for feedback. This process will be needed if the number of proposals is greater than 6.

- **Week 13:**
  Project prioritization – The CBC will provide a portal for the Neuroscience Affinity Group to vote on proposals. The top selected projects from (Week 11) will present a 15-minute pitch to the Affinity group. The community will then prioritize the top two to three proposals that will be eligible to receive CBC funding (of up to $250,000 total over two-years to fund a joint postdoc and their experiments); while the ideas that were not chosen for CBC funding continue to be workshopped to eventually seek out and win awards from other funding sources.