Parental
Brain 2025

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Practical information for participants

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Introduction

Dear participant at the Parental Brain 2025,

Thank you for contributing to the success of our upcoming congress. This document is designed to provide you with all the practical information you need to ensure a smooth and enjoyable experience during your participation. It includes details about the venue, program, technical specifications, accommodation, transportation, and other important aspects.

Should you have any questions or require further assistance, please do not hesitate to contact us on parentalbrain2025@teclat.com.

1. General information

Congress venue and location

The congress will take place at the Barcelona Biomedical Research Park (PRBB), located at C/ Doctor Aiguader, 88, 08003 Barcelona. You can find directions to the venue here.

Congress program

Please refer to the program on the website for an overview of all sessions (some schedules may still vary slightly). All sessions will take place in the auditorium of the PRBB, properly signposted upon your arrival.

2. Door opening and badge collection

Doors at the PRBB will open at 1.30 pm on Wednesday, May 7th for badge collection and installation of posters. You will find us at the entrance of the Auditorium.

Badge collection will also be available on Thursday, May 8th before the start of the morning sessions.

3. Meals

During the three days of the meeting, there will be coffee breaks (see the programme), and on Thursday, May 8, a standing finger dinner will be served for all participants on the PRBB terrace.

Lunch on May 8 is not included, and participants are free to make their own arrangements. Please see this section of the website for information about nearby restaurants: https://www.parentalbrainmeetings.com/places-to-eat

4. Young Investigators aperitif

On Wednesday, May 7, the young investigators attending the conference are scheduled to gather for an informal aperitif to connect and network. Magdalena Martínez-García is the coordinator (mmartinez@hggm.es), and she has sent a message with detailed information to all registered young investigators.

5. Streaming and recording

All sessions will be streamed live for remote attendees. Recordings will be made available exclusively to registered participants for one month following the congress. The access link will be provided one day before the start of the meeting.

Important! During the Parental Brain meeting, there will be journalists, photographers, and other media professionals recording videos and taking photographs. In order to protect the image rights of all participants, when collecting their accreditation, attendees will be asked to sign a consent or non-consent form regarding their appearance in the recordings, which may later be made public.

6. Transportation in Barcelona

Airport to city centre

There are several convenient public transport options to reach Barcelona city center from Barcelona El Prat Airport:

By Underground: Find here information about lines, tickets and fares: https://www.tmb.cat/en/barcelona/metro/lines

By Aerobús:

- Take the Aerobús (express shuttle bus) from the airport to Plaça Catalunya.

By Train:

- From Terminal 2, take the R2 Nord commuter train to Passeig de Gràcia station.

Estimated travel time: Around 45–60 minutes, depending on the option and connection times.

Taxi and Ride-Hailing Services:
If you prefer a direct and comfortable option:

- Taxi: Official Barcelona taxis are black and yellow. A ride from the airport to the city center typically costs between €35 and €40, depending on traffic and time of day. There is a minimum fare of €21 for airport trips. Taxis are available at designated ranks outside both Terminal 1 and Terminal 2.

- Uber: Uber operates in Barcelona. The cost from the airport to the city centre generally ranges from €27 to €35, depending on demand and time of day. You can request a ride via the Uber app, and pickup points are located at the designated rideshare areas of each terminal. Follow the app's instructions to find your driver.

7. Safety in Barcelona

Barcelona is generally a safe and welcoming city for both residents and visitors. However, as with any major tourist destination, it's important to take a few basic precautions to avoid petty theft.

Tourists should avoid leaving backpacks, handbags, or jackets hanging on the backs of chairs in restaurants or cafés, especially in popular tourist areas. It's also wise not to leave your phone on the table or unattended, as this can be an easy target for pickpockets.

Keep your personal documents securely stored and out of sight and be particularly cautious when using the metro or other forms of public transportation, where crowded spaces can make it easier for thieves to operate.

Using a crossbody bag that can be zipped shut and kept in front of you is highly recommended. Staying aware of your surroundings and taking small preventative measures can go a long way in ensuring a safe and enjoyable stay in the city.

8. Abstracts of the keynote speakers and symposia speakers

MAY 7

KEYNOTE SPEAKER

NEUROANATOMICAL CHANGES ASSOCIATED WITH HUMAN PREGNANCY

Dr. Carmona S

In this talk, I will present recent findings from longitudinal MRI studies that track women from preconception through the postpartum period. Current evidence reveals that pregnancy induces significant and enduring changes in the human brain. These changes appear to be linked to fluctuations in sex steroids and may play a crucial role in facilitating the maternal transition.

SYMPOSIUM 1

THE FATHERING BRAIN: HOW GREAT DADS ARE MADE, NOT BORN

Saxbe D

University of Southern California, USA

This talk will review several studies on brain changes across the transition to parenthood in first-time human fathers. We find that men show cortical volume decreases that are similar to those seen in mothers, but are less significant and more variable. We also show that when men express more motivation to parent, and more engagement in parenting, they show larger gray matter volume decreases. At the same time, gray matter volume decreases are associated with more postpartum mental health problems and poor sleep quality. The talk will also describe research on perinatal resting state connectivity and white matter changes in men, and functional studies on men reacting to infant stimuli and emotional faces.

NEUROBIOLOGICAL CHANGES ACROSS THE TRANSITION TO HUMAN FATHERHOOD

Rilling JK

Department of Psychology, Emory University, USA

Among biparental non-human species, males often experience neurobiological changes that prepare them for fatherhood. Recent studies in human fathers have demonstrated changes in cortical thickness across the transition to fatherhood, but changes in brain function have been only minimally explored. We recruited first-time expecting fathers and non-father controls for a longitudinal study that followed men across their transition to fatherhood to document changes in brain anatomy and brain function. Structural and functional MRI scans were acquired from expecting fathers between 4 and 5 months gestation and again at 4 postnatal

months, after several months experience with their infant. Nonfather controls were scanned over a similar time interval. Participants viewed infant photographs during the fMRI scan. New fathers experienced increases in cortical thickness in the right insula, pars opercularis, supramarginal gyrus and orbitofrontal cortex that were not found in nonfathers. In response to cues predicting infant pictures, new fathers showed a pre- to postnatal increase in activation of brain regions that are part of the mesolimbic dopamine system, a system involved with parental motivation, and this change was not found in non-father male controls. Compared with nonfathers, fathers also showed larger increases in activation to infant cues within the above cortical regions that showed volumetric increases. Finally, fathers, but not nonfathers, showed increased activation to infant pictures in brain regions implicated in empathy, such as the anterior insula. Our findings suggest that human fathers experience neuroanatomical and neurofunctional changes that may adapt them to their new parental role.

CARING DADS: THE SOCIAL NEUROSCIENCE OF ATTACHMENT AND CAREGIVING IN FATHERS

Vrticka P

University of Essex, England

Today's dads are more strongly involved in childcare activities than ever before, and attachment theory increasingly recognises fathers' importance as caregivers and attachment figures for their children. In our research, we aim at investigating the neurobiological processes underlying paternal caregiving and attachment. To do so, we are looking at fathers' brain activity and structure as well as father-child interpersonal neural synchrony (INS) and compare these measures to the same measures obtained from mothers, mother-child dyads and non-fathering men. In my talk, I will first show data from a functional magnetic resonance imaging (fMRI) study during which fathers and mothers play a virtual ball-tossing game "Cyberball" with their 5-6-year-old child and an unknown child. While our results reveal many similarities in fathers' and mothers' brain activity, we find stronger paternal versus maternal brain activity in areas related to mentalising during children's exclusive play interaction with another child. I will then summarise structural MRI findings revealing no differences in hypothalamus volume between fathers and non-fathering men but a significant positive correlation between self-reported caregiving beliefs and hypothalamus volume in fathers. Finally, I will show that fathers' caregiving beliefs are also positively correlated with father-child INS during a problem-solving task, and that father-child INS is higher than mother-child INS while the opposite pattern is present for behavioural synchrony. Altogether, our findings importantly advance our understanding of paternal brain activity and structure as well as father-child INS and particularly their similarities with and differences to data obtained from mothers, mother-child dyads and non-fathering men.

SENSORY PLASTICITY IN CALIFORNIA MOUSE FATHERS

Saltzman W

University of California Riverside, USA

In biparental species, fathers, like mothers, show increased attraction to sensory stimuli from infants, compared to reproductively naïve adults. In mothers, this increase is associated with plasticity in sensory systems that detect and process infant-related stimuli; however, little is known about sensory plasticity in fathers. We have been investigating effects of fatherhood on behavioral and neural responses to pup vocalizations and pup odors in the biparental California mouse (*Peromyscus californicus*), in which fathers, but not adult virgin males, are consistently attracted to and nurturant toward infants. When presented with pup odors and/or vocalizations, fathers, but not virgins, spent more time interacting with the pup cues than with control stimuli. Fathers had consistently lower Fos expression in the main olfactory bulbs, compared to virgins, but Fos responses to pup stimuli did not differ between the groups. Unexpectedly, auditory brainstem responses indicated that parents were less sensitive than virgins to tones around the frequency of pup vocalizations. Finally, the primary auditory cortex of fathers showed greater increases in spectral power in response to pup vocalizations and greater temporal fidelity across trials for pup calls, compared to virgin males. In spite of these differences in sensory processing, fathers and virgin males showed no differences in gene expression of the oxytocin receptor or vasopressin (V1a) receptor in the auditory and olfactory cortices. Collectively, these findings indicate that male California mice undergo changes in neural processing of pup vocalizations and odors during the transition to fatherhood, which might facilitate the onset of paternal care.

A NEURAL BASIS FOR REINFORCEMENT OF PARENT-INFANT INTERACTIONS

O'Connell, L

Stanford University, USA

Parenting quality has far-reaching impacts on many aspects of offspring survival. Signals of need by offspring require accurate and precise interpretation by their caregivers to provide care. However, little is known about the neural basis of communication between parents and offspring, and even less is known in biparental species about how synchrony between parents can influence offspring care. Filling this knowledge gap in parental behavior circuit architecture is essential for understanding the basic brain mechanisms underlying high quality parenting, and how this variation influences offspring development. Poison frog tadpoles are altricial and rely entirely on parental investment for healthy development. In the biparental Mimic poison frog (*Ranitomeya imitator*), mothers provide more food to tadpoles that beg (vibrate) more intensely, suggesting somatosensation (touch) is an important component of offspring signaling need. We found that parents, depending on sex, may use different offspring signals to make care decisions. In parallel, we explored how parental brains respond to the begging behavior of their offspring. We found that offspring touch coincides with activation of opioid pathways and suppression of nociceptive pathways. When opioid signaling is perturbed, we found that only high care fathers modify their contact with offspring. Currently, we are

delineating what neural pathways are recruited during parental care, and what individual variations drive increased or decreased attentiveness to offspring. Overall, we aim to better understand how endogenous opioids regulate bonding and motivation to care for offspring.

MAY 8

KEYNOTE SPEAKER

NEUROENDOCRINE BASIS OF RODENT MATERNAL BEHAVIOUR: MY JOURNEY FROM OXYTOCIN VIA VASOPRESSIN TO CRF – AND BACK

Bosch O

Group, Department of Behavioural and Molecular Neurobiology, University of Regensburg, Regensburg, Germany

Maternal behaviour in rodents has been the focus of my scientific interest ever since I moved to the field of neuroscience. Studying the various aspects of maternal behaviour in general, and the adaptations in the maternal brain in particular, never gets old. The neuroendocrine mechanisms underlying maternal behaviour are many-faceted and often brain region and context dependent, highlighting the complexity of the maternal brain. And studying maternal behavior in preclinical models bears indispensable translational value.
I will take you on my journey through the rat maternal brain and behaviour, from oxytocin controlling maternal aggression to vasopressin triggering maternal care and the rather “anti-maternal” corticotropin-releasing factor (CRF) system. At one point, the latter came into my focus - and with it the consequences of failed adaptations. In closing the circle, the CRF system can interact with the oxytocin system, which might culminate in a compensatory mechanism to reinstate the maternal allostasis in perturbed, and potentially detrimental, conditions.

While many advances have been made over the last decades to reach a better understanding of maternal brain adaptations, many more questions are waiting to be answered in the future.

JNE YOUNG INVESTIGATOR SYMPOSIUM

THE TRANSITION TO MOTHERHOOD: A MULTILEVEL STUDY ON THE BRAIN’S TRAJECTORY ACROSS PREGNANCY AND POSTPARTUM.

Servin-Barthet C

Pregnancy represents a transformative journey marked by critical psychological adaptations to motherhood. In humans, neuroimaging studies scanning women before and after pregnancy and around the peripartum suggest that first-time mothers experience a remodeling of brain architecture that predicts postpartum maternal attachment towards the newborn. However, no previous study has charted the complete trajectory of human brain change from pre-

conception throughout pregnancy and postpartum, integrating multimodal neuroimaging data, endocrine assessments, and neuropsychological information.

In this communication I will present the results from my latest research. I will focus on describing the U-shaped trajectory that gray matter volume exhibits during the transition to motherhood, dipping in late pregnancy and partially recovering during postpartum. I will also talk about whether the observed neuroanatomical trajectory differs based on the functional location of the changes and how it is predominantly linked to gestational factors, as it is only present in gestational mothers and correlates with fluctuations in estrogens over time. Finally, I will discuss how the mother's mental health status mediates the relationship between postpartum gray matter volume recovery and maternal attachment. Together the presentation will shed light on the complex interplay between hormones, brain, and behavior during the transition to motherhood, therefore filling a critical void in the human maternal brain literature.

THE HYPOTHALAMUS UNDERGOES DYNAMIC ADAPTATIONS IN THE TRANSITION TO MOTHERHOOD

Paternina-Die M

Motherhood is a transformative experience that induces profound physiological and psychological adaptations. Neuroimaging studies have shown that human pregnancy causes pronounced changes in the cortical mantle associated with estrogen levels and maternal behaviors. Solid evidence from rodent data indicates that maternal behaviour is triggered by hormonal mechanisms within the hypothalamus. However, the effects of pregnancy on the human hypothalamus remain largely unexplored. Our aim is to delineate the hypothalamic changes throughout the transition to motherhood. We used a prospective longitudinal design that followed primiparous mothers at six time points: 1) before conception; 2) at 18 weeks of gestation; 3) at 34 weeks of gestation; 4) at one month postpartum; 5) at 6 months postpartum; 6) and at 18 months postpartum. We extracted the volumes of the hypothalamus and its subregions from T1-MRI acquisitions using Freesurfer. Data from the pregnant mothers were compared with a subset of their same-sex partners who did not undergo pregnancy (non-pregnant mothers) using Linear Mixed-Effects Models and Generalized Additive Mixed Models. Results suggest a dynamic trajectory in the hypothalamus of pregnant mothers, with volume increases during pregnancy followed by decreases after childbirth that fully recover at eighteen months. No hypothalamic changes were observed in non-gestational mothers throughout their partner's pregnancy or after parturition, highlighting the unique neurobiological adaptations associated with pregnancy. This trajectory suggests a negative association between the changes in the cortical mantle and those occurring in the hypothalamus.

SINGLE-CELL RNA SEQUENCING OF THE MATERNAL HYPOTHALAMUS REVEALS A DISTINCT NEUROENDOCRINE TRANSCRIPTOME IN PREGNANCY

Amarsi R

Background: Pregnancy is characterised by a profoundly changed endocrine environment. Although the maternal hypothalamus represents a critical hormonal target, the exact

neuroendocrine pathways, which regulate widespread adaptations across various maternal organs, are scarcely known. To address this, we conducted a single-cell RNA sequencing (scRNA-seq) investigation of the pregnant mouse hypothalamus.

Methods: We generated four independent scRNA-seq datasets of the whole hypothalamus from fasted pregnant (embryonic day 16.5) and virgin mice (n=2 per group). Datasets were combined and then mapped to a recently published transcriptional reference atlas of the murine hypothalamus, the “HypoMap”, which provided a validated set of functional annotations of hypothalamic cell types. A stringent “pseudobulk” differential expression analysis was applied to identify pregnancy-induced genes within biologically relevant populations of the hypothalamus.

Results: A distinctive transcriptome in pregnant mice was observed across all hypothalamic cell-types. Within neuronal cell-types, two functional regions were observed as transcriptional hotspots of pregnancy: the arcuate nucleus and medial preoptic area. Detailed sub-region analysis of the arcuate nucleus revealed extensive transcriptional shifts within distinct neuronal sub-populations, particularly the dopaminergic neurons. Moreover, these sub-region analyses identified candidate genes involved in hormone receptor pathways, including the estrogen receptor co-regulator, Cited1.

Conclusion: This high-throughput, cell-specific comparison of the virgin and pregnant hypothalamus has unveiled a unique transcriptional landscape of pregnancy. Our work introduces neuroendocrine pathways in the arcuate nucleus as novel targets for the dynamic hormonal concentrations in late-gestation, and highlights the strength of scRNA-seq as an unbiased tool for deciphering the complex adaptations of the maternal hypothalamus.

THE ROLE OF MIDBRAIN DORSAL RAPHE CRFR2 IN POSTPARTUM CAREGIVING AND AFFECTIVE BEHAVIORS

Meinhardt T

The transition to motherhood is typically marked by high levels of infant caregiving that are accompanied by a positive affective state. Unfortunately, the neural mechanisms promoting positive postpartum affective behaviors are very poorly understood. While numerous forebrain sites have been examined for this role, midbrain sites such as the dorsal raphe (DR; the largest source of forebrain-projecting serotonin cells) have mostly been neglected. DR neurons express many neurochemical receptors that alter DR functioning, including stress-related CRF receptors. Interestingly, the DR is one of few brain regions that densely express the stress-related CRF type 2 receptor (CRFR2), which influences social and affective behaviors in males, but their role in postpartum caregiving and affective behaviors in females is unknown. We recently found that new mother rats have twice as many rostral DR cells expressing CRFR2 mRNA as compared to virgins. Therefore, we hypothesized that upregulated DR CRFR2s are necessary for positive affective states in the early postpartum period and thus facilitate the display of maternal caregiving, particularly after stress. To test this, we pharmacologically antagonized CRFR2s in the rostral DR of early postpartum mothers to investigate the effects on caregiving and anxiety-like behaviors after exposure to a mild stressor; we also mapped the neuroanatomical projections from DR CRFR2-expressing neurons to four forebrain sites critical for postpartum behavior (NAc, mPOA, CeA, AH).This

research is providing novel insight to the mechanisms driving postpartum adaptations in behavioral susceptibility to stress, with implications for stress-related derailments in maternal affective state and infant caregiving in women.

EXAMINING THE ROLE OF IL-1R ANTAGONISM IN TREATING POSTPARTUM DEPRESSION USING A RODENT MODEL

Garcia de Leon R

Background: Depression risk is highest during the postpartum [postpartum depression (PPD)]. Selective serotonin reuptake inhibitors (SSRIs) are often prescribed for PPD, however, only 3.2% of females with PPD achieve remission with SSRIs. In our preclinical model of PPD, we administer high corticosterone (CORT) during the postpartum. We found increased levels of the proinflammatory cytokine IL-1β in the hippocampus was commensurate with reduced SSRI efficacy, indicating this may be an important target to boost SSRI efficacy. Our central hypothesis is that antidepressant efficacy in the postpartum is mediated by inflammatory signalling.

Methods: High CORT was administered during the postpartum period to dams starting on postpartum day 2 along with fluoxetine (FLX) and/or anakinra (KIN), an IL-1R antagonist. FLX efficacy was measured using the forced swim test (FST), and maternal care observations. All dams were euthanized 23 days later to examine inflammation and neuroplasticity in the hippocampus.

Results: Dams treated with KIN (with or without FLX) failed to rescue passive coping behaviours in the FST. However, FLX and KIN together were able to rescue reductions in neuroplasticity as noted in hippocampal perineuronal net (PNN) expression and doublecortin (DCX+ cells) expression. Current analyses are in progress to quantify PNNs in the frontal cortex, alongside postsynaptic density-95 (PSD-95) in both hippocampal and frontal cortex tissue. Lastly, we will quantify the percentage of phagocytic microglia (Iba1+/CD68+) in the hippocampus and frontal cortex.

Conclusions: These findings indicate that IL-1β may serve as a potential target for increasing antidepressant efficacy in people with PPD.

NEURAL SUBSTRATES IN THE POSTPARTUM BRAIN FOR FLEXIBLE MATERNAL CARE

Yang M

Flexible infant-oriented maternal behavior is driven by multisensory cues from the offspring. An example of such behavioral flexibility in maternal mice (dams) is the rapid transition from nursing in the nest to exiting the nest in search of misplaced pups. This involves a sensory competition between distress calls, emitted by pups outside the nest, and somatosensory contact with pups inside the nest. Inflexible maternal behavior can be a symptom of postpartum depression. While selective serotonin reuptake inhibitors are a common treatment, it remains unclear how serotonin regulates responses to infant cues in maternal brain networks. Therefore, understanding the neural mechanisms responsible for processing

competing infant cues and modulating flexible maternal behavior is essential for improving maternal care. Here, we investigated the neural substrates involved in the processing of competing infant cues, and their modulation by serotonin. We identified a neural hub for infant cue processing: calbindin-expressing neurons in the posterior intralaminar thalamus (PILcb). Using channelrhodopsin-assisted circuit mapping, we found that PILcb neurons receive input from primary sensory nuclei and send output to the paraventricular nucleus to control oxytocin release and maternal behavior. PILcb neurons were more excitable in dams than in virgins and showed a particular preference for input frequencies consistent with the frequency range of pup calls. We observed a dense distribution of serotonergic fibers in PIL, and bath application of serotonin significantly increased the resting membrane potential of PILcb neurons. Calcium imaging revealed that auditory stimuli activated PILcb neurons. Finally, using the GRAB5-HT sensor, we found that serotonin levels in PIL are modulated by pup calls. Our findings establish PIL as a bottleneck station, uniquely positioned for processing of multisensory infant cues, potentially modulated by serotonin.

SYMPOSIUM 2

SOCIAL PHYSIOLOGY: THE METABOLIC ROOTS OF CAREGIVING

Atzil S

Hebrew University of Jerusalem, Israel

Human physiology is inherently social. From birth, infants depend on caregivers for the regulation of their bodily states. Parental care is thus directed toward supporting the infant's allostasis—from basic metabolic needs to emotional arousal. Through affective communication and caregiving behaviors, parents serve as external regulators, ensuring the infant's survival and promoting healthy development.

In this talk, I will present a proof of concept for the framework of *Social Physiology* in humans. I propose that the neural infrastructure underlying parental and social care draws heavily on visceromotor circuits—brain systems responsible for regulating internal bodily states. These circuits enable parents to incorporate their infants into their own allostatic systems, modulating the infant's physiology as part of an ongoing regulatory loop that begins in pregnancy. I will discuss how the visceromotor system, with its roles in autonomic control, reward, and social cognition, provides a biological foundation for caregiving and shapes developmental trajectories. This framework also offers new insights into perinatal psychopathologies, such as postpartum depression, which may reflect a breakdown in these regulatory systems due to allostatic overload.

MOTHERS WITH OPIOID USE DISORDER: CLINICAL TRIAL OF MOM POWER PARENTING PSYCHOTHERAPY WITH MULTIMODAL NEUROIMAGING

Swain JE

Stony Brook University, USA

Background: Opioid Use Disorder (OUD) and related issues of stress, depression and anxiety disrupt maternal brain neurocircuits (MBN) that govern sensitive parenting despite medication assisted therapies. We studied the effects of evidence-based Mom Power (MP) psychotherapy on brain-behavior mechanisms.

Methods: Mothers with OUD (n=11) received MP—a 13-session evidence-based parenting group psychotherapy. We collected and analyzed (paired-sample t tests) pre vs. post MP survey and multimodal neuroimaging data. Surveys included Opiate Craving Scale (OCS), Edinburgh Postpartum Depression Scale, Post-Traumatic Stress Disorder (PTSD) Checklist & Parenting Stress Index (PSI). Neuroimaging included event-related potential responses (ERPs) to standardized photos of Crying, Laughing and Neutral unknown children, and functional magnetic resonance imaging (fMRI) of the MBN comparing “joining” vs. “observing” emotional photos of own vs. unknown child.

Results: Post- vs. Pre-MP, participants showed significant reductions in depression, PTSD and PSI. ERP N170 responses were reduced for Crying vs. Neutral faces and fMRI empathic attunement in the MBN were enhanced for Join vs. Observe own vs. other child's joyful vs. distressed face. Furthermore, post- vs. Pre-MP reduction in OCS correlated with concomitant reductions in depression and increased late positive potentials to Laughing vs. Neutral and Laughing vs. Crying faces (all p’s <0.05).

Implications: For mothers with OUD, MP improved indices of mental health showcasing the benefits of interventions, such as MP, to optimize maternal mood and parenting quality. Furthermore, MP modulated the MBN, suggesting mechanisms that may lead to validated assessment methods that might be more broadly applicable to other perinatal states/disorders.

DEVELOPMENT OF RAPID-ACTING NEUROACTIVE STEROID ANTIDEPRESSANTS FOR POSTPARTUM DEPRESSION

Deligiannidis KM

Feinstein Institutes for Medical Research, USA

Perinatal depression is one of the most common complications of childbearing yet is underdiagnosed and undertreated. Untreated/undertreated perinatal depression is associated with adverse effects on the well-being of the mother, child and the family. For women requiring antidepressant treatment, conventional serotonergic antidepressants have been the mainstay of postpartum depression (PPD) treatment for many years. This presentation will highlight preclinical and clinical studies supporting a role for neuroactive steroids in the pathophysiology

of perinatal depression and then discuss the clinical trial data that led to the U.S. Food and Drug Administration's (FDA) approval of two rapid-acting neuroactive steroid antidepressants for PPD. Brexanolone, an intravenous preparation of synthetic allopregnanolone, was FDA approved in 2019 for the treatment of PPD in females 15 years old and older. Brexanolone is administered as a 60-hour infusion in medically supervised settings. Zuranolone, an oral allopregnanolone analog, was FDA approved in 2023 for the treatment of PPD in adult females. Zuranolone is administered as a 14-day oral at-home treatment. Finally, the clinical use of conventional serotonergic and newly FDA-approved rapid-acting neuroactive steroid antidepressants will be discussed, including use in lactation.

REDUCED EXTRACELLULAR FREE WATER IN THE BRAIN IN POSTPARTUM DEPRESSION

Bergé D

Hospital del Mar Research Institute, Barcelona, Spain

Although abnormal periphery inflammatory markers have been reported in depression, little is known about the interplay between perinatal depression and the physiological inflammatory changes that occur during pregnancy and postpartum. Extracellular free-water in the brain (FW) has been suggested as an in-brain inflammatory marker which, surprisingly, has not yet been studied in perinatal depression.

Thirty-eight control mothers and 34 mothers with perinatal depression were evaluated at 8 weeks postpartum including an assessment for depression using EPDS and HDRS scales, and an MRI scan covering a structural and a diffusion sequence. FW was calculated for every voxel and then averaged across gray matter volume, and interpolated to gray matter (GM) cortical surface for every subject. Participants were grouped into controls, depression only during pregnancy, and depression involving the postpartum. Between-group comparisons and correlations with depression rating scales were implemented for average measures, and the corresponding regional differences were explored using surface-wise measures.

Between three-groups comparison ($F=4.131, p=0.020$) showed lower average FW in GM in postpartum depression as compared to controls ($p=0.019$), and regional differences in a large cluster involving right temporal, parietal and frontal cortical regions. FW in GM inversely correlated with HDRS score ($r=-0.289, p=0.014$), and showed a trend to significance with EPDS score ($r=-0.201, p=0.095$) across all participants.

Plot figures and statistical brain maps showing regional differences will be included in the oral communication, as well as a brief discussion of the hypothetical underpinnings of these findings in the context of physiological and pathological inflammatory changes during the perinatal period.

CAN TARGETING THE GUT-MICROBIOTA HELP US UNDERSTAND PLASTICITY OF THE MATERNAL BRAIN?

Pawluski JL

University of Rennes

The transition to motherhood is a time when nearly all aspects of a female's existence are modified – from her neurobiological processes to her social role. In recent years we have increased our interest in this developmental period on a woman's life with a focus on understanding the neurobiology of motherhood and maternal mental health. However, we have much to learn about plasticity in the maternal brain and the mechanisms behind these changes. Current research points to a key link between the gut microbiome and brain plasticity showing that the gut-microbiome-brain axis is a fundamental biological system linked to a variety of health outcomes throughout life. How this system relates to neuroplasticity in motherhood, in health and illness, remains to be determined. Over the past few years, my research has aimed to 1) better understand the gut-microbiome-brain axis across pregnancy and motherhood, and 2) determine how targeting this axis may aid in our understanding of the maternal brain and perinatal mental illness. Focusing on these two general aims, I will briefly introduce how the gut-microbiome-brain axis changes with pregnancy in the adult female and the limited literature on how stress impacts the gut-microbiome of motherhood. I will then discuss our recent findings on how targeting the gut microbiome may be linked to neuroplasticity in the maternal brain. Further research is needed to understand the gut-microbiome-brain axis in motherhood, but there is no doubt that this is a promising target system for understanding the maternal brain and improving maternal mental health.

This work was funded in part by a grant from BINC Geneva and the INCR Rennes.

SYMPOSIUM 3

DEVELOPING A RODENT MODEL OF POSTPARTUM ANXIETY THAT TRANSLATES TO HUMAN SAMPLES

Graham B

University of New South Wales, Australia

Background: A major impediment to developing an understanding of the biological mechanisms of postpartum anxiety disorders in humans is the lack of an adequate animal model. Female rats and humans undergo similar hormonal changes across pregnancy, and the mechanisms of anxiety regulation are highly conserved across species. This suggests that studying the neurobiology of anxiety and its regulation in postnatal rats may provide novel insights into the biological factors that contribute to postnatal anxiety in humans.

Methods: We compared the hormonal, neural, molecular and behavioural mechanisms of anxiety regulation in virgin female rats and primiparous (one prior litter of pups) female rats,

as well as samples of human participants with or without a prior history of pregnancies. We used validated models of fear conditioning and fear extinction, as well as tests of innate anxiety (e.g., the elevated plus maze, or ecological momentary assessment of anxiety in humans) that measure species-specific anxiety responses.

Results: We find that the hormonal, neural, molecular and behavioural mechanisms of anxiety regulation undergo a fundamental shift in both female rats and humans as a consequence of pregnancy. These changes are driven by pregnancy-induced long-lasting reductions in circulating levels of the sex hormone oestradiol, as well as a blunting in the neurosteroid allopregnanolone, a natural anxiolytic.

Implications: These findings validate the use of rodent models to develop knowledge on mental health conditions in humans in the postpartum period, and may point to novel hormonal treatments (e.g., allopregnanolone) for postpartum anxiety disorders.

A PROLACTIN-SENSITIVE NEURAL CIRCUIT THAT REGULATES REWARD PATHWAYS AND PARENTAL BEHAVIOUR IN MALES AND FEMALES

Brown R

Centre for Neuroendocrinology and Department of Physiology, University of Otago, Dunedin, New Zealand

Prolactin action in the medial preoptic area of the hypothalamus (MPOA) is critical for the display of maternal behaviour, and also required for normal paternal behaviour in males However, how prolactin-sensitive neurons in the MPOA integrate into the neural circuit that underlies parental behaviour has been unclear. Using *in vivo* fibre photometry, the specific components of parental behaviour during which MPOA prolactin-sensitive neurons show increased activity were characterised. We have identified a prolactin-sensitive MPOA projection to the ventral tegmental area, a key brain region in regulating reward behaviour. In both male and female mice, optogenetic activation of this circuit can drive dopamine release into the nucleus accumbens, and promote pup-directed aspects of parental behaviour.

NEUROIMMUNE REGULATION OF PLASTICITY IN THE MATERNAL BRAIN FOLLOWING GESTATIONAL STRESS

Leuner B

The Ohio State University

Pregnancy confers vulnerability to mental health disorders, with 20% of new mothers experiencing Postpartum Depression (PPD). The mechanisms contributing to mood dysregulation and impaired maternal care in PPD are not well understood, but stress during

pregnancy is a strong risk factor. During pregnancy, the brain becomes highly plastic to allow for changes in maternal mood and caregiving behavior. Pregnancy is also accompanied by dynamic immune changes both peripherally and in the brain, and immune dysregulation has been implicated in postpartum mood disorders. Microglia, the main CNS immune cell, have a well-established role in regulating synaptic plasticity through phagocytic activity and the release of secreted factors in both non-stressed and stressed states; though little is known about microglia-regulated plasticity in the peripartum period. This talk will focus on our recent work using a rodent model showing that gestational stress exposure leads to a postpartum-depression-like behavioral phenotype accompanied by substantial alterations in the neuroimmune environment of the maternal brain. These neuroimmune changes include significant shifts in inflammatory mediators, microglia phagocytic properties, and downstream microglia-mediated remodeling of perineuronal nets within the prefrontal cortex, a region important for regulating both mood and maternal behavior. Understanding how gestational stress-induced remodeling of perineuronal nets by microglia may contribute to the underlying pathophysiology of PPD is a novel avenue for future research and interventional strategies.

Funding Sources for the Research: National Science Foundation Award Number 211438; National Institute of Mental Health R21 MH117482-02.

STATE-DEPENDENT FLEXIBILITY OF PARENTAL CIRCUITS

Kohl J

The Francis Crick Institute, England

Parenting is an instinctive behavior supported by species-specific motor programs, yet it is flexible and shaped by experience and internal states. Using the mouse as a model, we are uncovering the mechanisms behind this flexibility. I will present recent findings showing how parental circuits are remodelled across long (days–weeks) timescales. During pregnancy, physiological changes prepare the body and brain for motherhood, yet the role of pregnancy hormones in remodelling parental circuits remains unclear. We found that action of estradiol and progesterone on galanin (Gal)–expressing neurons in the mouse medial preoptic area (MPOA) is critical for pregnancy-induced parental behavior. Whereas estradiol silences MPOA-Gal neurons and increases their excitability, progesterone rewires this circuit node by promoting dendritic spine formation and recruitment of excitatory synaptic inputs. This MPOA-Gal-specific neural remodeling sparsens population activity and results in persistently stronger, more selective responses to pups. Pregnancy hormones thus remodel parenting circuits in anticipation of future behavioral need. Additionally, I will present new data on how hunger and estrous state are integrated at the cellular level in the MPOA to flexibly tune pup interactions over shorter timescales (minutes–hours). These findings provide key mechanistic insights into the flexibility of parental behavior.

LOVE, DEATH, AND OXYTOCIN: THE CHALLENGES OF MOUSE MATERNAL CARE

Froemke R

New York University, USA

The neuropeptide oxytocin is important for maternal physiology and social behavior. In this talk, I will discuss new and unpublished data from our lab on when, where, and how oxytocin is released from hypothalamic neurons to enable maternal behavior in new mother mice. I will focus on maternal responses to infant distress calls, and how oxytocin enables rapid neurobehavioral changes for dams and alloparents to recognize the meaning of these calls. We have built a new system combining 24/7 continuous video monitoring with neural recordings from the auditory cortex and oxytocin neurons of the hypothalamus in vivo. With this documentary approach, we have identified behaviors of experienced and naïve adults learning to co-parent together which also activate oxytocin neurons. I will discuss circuits routing sensory information to oxytocin neurons leading to oxytocin release in target areas important for maternal motivation. Finally, I will discuss longer-term behavioral monitoring over months, examining how single mothers build nests to help ensure pup survival or how this sometimes goes awry.

MAY 9

SYMPOSIUM 4

CELLULAR MECHANISMS MEDIATING THE LONG-TERM EFFECTS OF PREGNANCY, POSTPARTUM AND STRESS EXPERIENCES IN THE MATERNAL BRAIN

Chan J

Pregnancy and postpartum periods represent incredible physiological stressors, yet while effects of psychosocial stresses are well-documented, how reproductive experiences persistently alter the maternal brain remain unknown. Moreover, parity (previously carrying one or more pregnancies to term) is a complex risk factor. In general, parity promotes parenting adaptations. However, in some individuals, parity increases susceptibility for perinatal or postpartum mood and anxiety disorders. Therefore, understanding the biological processes that orchestrate and disrupt parity effects in the brain is essential. Using mice, we performed brain-wide transcriptional profiling to identify regions sensitive to parity. The dorsal hippocampus (dHpc) exhibited greatest plasticity one month post-weaning, which associated with enhanced contextual fear conditioning and pup retrieval performance. Dissecting the contributions of pregnancy and postpartum experiences, we found that while pregnancy initiates dHpc programming, additional postpartum interactions are required for full transcriptional alterations. Thus, we next tested the impact of postpartum stress using a maternal separation with limited nesting model. We found that stress disrupted both parity-dependent transcriptional and behavioral adaptations. Using single nuclei RNA-sequencing to determine cellular origins of dHpc changes, we identified changes to dopamine receptor-expressing neurons, suggesting altered dopamine regulation contributes to dHpc plasticity. Chemogenetic inhibition of the VTA to dHpc projection further demonstrates the essential role of dopaminergic signaling in mediating the long-term adaptive effects of parity on both dHpc

transcriptional and behavioral plasticity. These studies provide insight into the cellular mechanisms contributing to long-term effects of parity effects in brain, and the environmental triggers that interact to influence maternal brain health.

DIVERSE FORMS OF PLASTICITY SUPPORTING MATERNAL AGGRESSION IN FEMALE MICE

Yamaguchi T

To protect the helpless young, females dramatically increase aggression towards intruders during lactation, known as maternal aggression. However, attack is costly and risky. When pups no longer exist, maternal aggression loses its purpose and rapidly declines. Our study reveals the critical role of the pathway from estrogen receptor alpha-expressing (PAEsr1) cells in the posterior amygdala to neuropeptide Y receptor Y2 (VMHvlNpy2r) cells in the ventrolateral part of the ventromedial hypothalamus in the rise and fall of maternal aggression. Functional manipulations and photometry recordings demonstrate VMHvl-projecting PAEsr1 (PAEsr1□VMHvl) cells are naturally active and required for maternal aggression. In vitro slice recording showed that PA-VMHvlNpy2r connection strengthens and VMHvlNpy2r excitability increases to enhance VMHvlNpy2r responses to intruders and drive attack in lactating dams. Furthermore, we found oxytocin as a critical mediator to link pups' needs to the aggression circuit output. Interestingly, PA, not VMHvl, is the key site for oxytocin to boost the aggression circuit output. The abundant expression of oxytocin receptor (OXTR) in PAEsr1 cells enables oxytocin to increase the input-output relationship of PAEsr1 cells by increasing the input resistance of the cell. The decreased maternal aggression by the oxytocin level drops after pup separation can be restored by optogenetic stimulation of oxytocin neurons in the paraventricular hypothalamic nucleus. This recovered maternal aggression can be canceled by blocking PA OXTR signaling. Thus, diverse forms of plasticity occur at the PAEsr1-VMHvlNpy2r circuit to support maternal aggression, while oxytocin signals the need of the young, enabling the female to rapidly adjust its aggression.

UNCOVERING CONTRIBUTIONS OF THE MEDIAL PREOPTIC AREA TO MATERNAL SENSITIVITY

Pereira M

Maternal behavior that is sensitive to the offspring's needs is essential for the healthy development and emotional wellbeing in mammals. Offspring have different physiological and behavioral needs as they grow and develop, and mothers must promptly and flexibly adjust caregiving and affective interactions to meet those needs. However, the brain mechanisms that dynamically coordinate caregiving decisions with the needs of the offspring are not well understood. Our previous work in rats demonstrated that the medial preoptic area (mPOA), a critical node in the maternal behavior circuitry, is essential for maternal sensitivity, allowing mothers to flexibly adjust caregiving decisions to resolve the everchanging needs of their offspring. The present study investigates the contribution of mPOA neurons to sensitive caregiving decisions. Our findings demonstrate that chemogenetic inactivation of mPOA-to-infralimbic medial prefrontal cortex (IL) neurons disrupts cognitive aspects of maternal sensitivity in multiparous healthy mothers, leading to uniform maternal behavior regardless of

their offspring's needs. Conversely, chemogenetic activation of the mPOA ameliorated the significant disturbances in maternal sensitivity in the well-validated Wistar-Kyoto (WKY) rat model of depression, with WKY mothers now spending more time providing sensitive caregiving behaviors. Retrobeads retrograde tracing analysis revealed upregulated cFos expression in mPOA projections to the IL and ventral tegmental area (VTA) during maternal adjustments of care. Additionally, catFISH analysis of c-fos indicated that a distinct population of mPOA neurons play a crucial role in coordinating sensitive caregiving behaviors. This work expands on our understanding of the mPOA's contribution to sensitive parenting.

THE GLOBAL MATERNAL BRAIN PROJECT: UNITING SCIENCE AND COLLABORATION THROUGH THE ANN S. BOWERS WOMEN'S BRAIN HEALTH INITIATIVE

Martínez-García M

Each year, nearly 140 million women around the world experience one of the most transformative events of their lifetime - pregnancy. Yet, scientific knowledge of how pregnancy shapes the maternal brain—impacting mental health, cognition, and neurobiology- is still in its infancy. Over the past decade, pioneering longitudinal studies have revealed profound, dynamic, and lasting neurobiological changes in the maternal brain, laying the foundation for a burgeoning field of research. Despite these advances, current progress is constrained by the lack of large-scale datasets and global collaboration to account for variability in hormonal and immune signals, links to perinatal mental health, and the influence of socioeconomic factors and parental leave policies. The Global Maternal Brain Project (MBP Global), a key initiative of the Ann S. Bowers Women's Brain Health Initiative, seeks to address this gap by creating the world's largest longitudinal maternal neuroimaging database. We aim to recruit >1,000 first-time pregnant women across global strategic sites, tracking participants from pre-conception through years postpartum. Data collection includes standardised MRI scans at multiple time points, blood and stool samples for multi-omics profiling, assessments of sleep, cognition, and lifestyle factors, and evaluations of reproductive health and pregnancy outcomes. This initiative will generate an unprecedented open-access resource, empowering researchers to explore neurobiological questions previously out of reach and providing clinicians with critical insights for risk assessment.

PUP PHEROMONES INDUCE MATERNAL BEHAVIOURS

Martínez-García F

In rodents, pup directed behaviours change with hormonal condition and experience. While female mice are maternal, motivation increases during motherhood due to pregnancy hormones. Virgin males are infanticide whereas fathers are paternal. This involves poorly understood changes in the response of adults to pup chemosignals. Here, we report the results of experiments checking the working hypothesis that pup pheromones detected by the vomeronasal organ (VNO) become rewarding for females during motherhood, leading to pup(goal)-directed maternal behaviours.

We show that pup volatiles induce place-preference in mothers, but only elicit transient investigation (novelty effect) in virgin females. Late-pregnant females already show persistent

attraction to pup chemosignals, and egr-1 expression indicates that they activate the VNO. Indeed, pup-induced neural activity (cFos expression) increases in late-pregnant, as compared to virgin females, in key centres of the olfactory (piriform cortex), vomeronasal (posteromedial cortical amygdala), sociosexual (ventrolateral PAG) and motivational (AcbC) brain circuits. We have identified 11 specific volatiles from neonatal (3-4 day-old) pups using GC-MS based untargeted metabolomics. Most of them activate isolated VNO cells in vitro, as shown by means of calcium-imaging techniques.

In addition, when applied onto pup dummies, pup wash or mixtures of the identified pup volatiles, induce licking in females and paternal males (but attacks in virgin males), while reducing occasional attacks (virgin females). As a conclusion, pups emit rewarding pheromones that are induce pup(goal)-directed maternal behaviours in dams, but exacerbate attacks in infanticide adults (virgin males). In other words, pup pheromones help identifying pup-like objects (dummies) as true pups.

SEROTONIN RELEASE IN THE NAC AFFECTS MATERNAL BEHAVIOR

Simonnet C

Maternal care is a core component of mammalian behavior, involving the detection of offspring signals, execution of caregiving actions such as nest building, nursing, and thermoregulation, and the motivation to provide care despite stress or perceived threats. In our study, we observed that both primiparous and nulliparous mice perform pup retrieval in a familiar environment. However, only dams exhibit this behavior under anxiogenic conditions. These observations led us to investigate the neural circuits differentially engaged in dams versus nulliparous females during maternal behavior. We hypothesize that the nucleus accumbens (NAc) acts as a central hub integrating multimodal inputs related to maternal behavior. Specifically, we focused on afferent signals from serotonergic (5-HT) and dopaminergic (DA) neurons, which are implicated in regulating motivation, parental behavior, and the establishment of mother-offspring bonds.

Using fiber photometry, we observed that medium spiny neurons in the NAc respond oppositely in dams and nulliparous females during pup retrieval, indicating that distinct inputs may drive this activation. To further explore this, we used sensors to examine DA and 5-HT release in the NAc during pup retrieval. Unexpectedly, we found a decrease in 5-HT release correlating with successful pup retrieval under anxiogenic conditions in dams. Using optogenetic inhibition of 5-HT neurons, we enhanced pup retrieval behavior in dams. These findings suggest that changes in NAc activity and connectivity during the postpartum period enable maternal care behaviors to occur independently of external stressors.

KEYNOTE SPEAKER

Maite Egoscozabal and Laura Baena, Malasmadres Club, Spain

Title and abstract TBC

9. Poster authors and titles (provisional)

POSTER NUMBER	NAME	SURNAME	TITLE OF ABSTRACT
1	Valentine	Andreu	Early postpartum development of olfactory-guided maternal preference: the role of mom-pup interactions and urine cues
2	Antonella	Arrieta-Laurent	Attachment Styles and Their Relationship with Affective States, Sleep Quality, and Chronotype During Pregnancy and Early Postpartum.
3	Risha	Amarsi	Single-cell RNA sequencing of the maternal hypothalamus reveals a distinct neuroendocrine transcriptome in pregnancy.
4	Sofia	Attolini	Neuroanatomical signatures of postpartum depression: insights from a cross-sectional study
5	Kathy	Ayala	Bonding before birth: maternal-fetal attachment and maternal cortical connectivity in late pregnancy
6	Shanice	Bailey	State-dependent processing of olfactory information in the medial amygdala
7	Cristina	Ballesteros	Linking birth experience and perinatal depression symptoms to neuroanatomical changes in hippocampus and amygdala
8	Georgina	Benet	Perinatal depression and its long-lasting impact on infant neurodevelopment
9	Georgina	Benet	Neuroimaging of perinatal depression
10	Anna	Brugulat-Serrat	Late motherhood linked to accelerated memory decline in amyloid-positive cognitively unimpaired women
11	Dana Lizbeth	Canela	Crying baby elicits different electroencephalographic responses in teenage and adults' mothers
12	Irene	Caselli	TBC
13	Sílvia	Castany	Social transmission of inflammation during the postnatal period and adulthood
14	Laura R.	Cortés	Role of hypothalamic estrogen signaling in thermoregulatory changes during pregnancy
15	Arielle	Crestol	The genetics of reproductive subtypes of depression in females: What do we know?
16	Kimberly	D'Anna Hernandez	The role of providers and medical racism in disparities in Black mothers
17	Sofija	Djordjevic	The moderating role of maternal sleep quality in the relationship between parenting stress and infant crying behavior (presented by Dr. Thomason and McCormack)
18	Elena	Federici	Measuring intergenerational transfer effects reflected through parent-child similarity of the corticolimbic tract
19	Bianca	Filippi	You're not alone: the effect of romantic partner physical presence on cortical response to infant stimuli in nulliparous women
20	Jonas L.	Fischer	Late-life traces of parenthood in structural brain MRI data
21	Melanie	Freund	Longitudinal changes of brain structures across the female reproductive lifespan

22	Clara	Gallay	Exploring the impact of social factors and number of childbirths on white matter hyperintensity in post-menopausal women at risk of AD
23	Romina	García de León	Examining the role of IL-1R antagonism in treating postpartum depression using a rodent model
24	Micol	Gemignani	Maternal Electrophysiological Response to Interactions with Their Own Child: A Preliminary Study in a Sample of Same-Sex Mothers
25	Micol	Gemignani	Early experiences with caregivers and neural responses to infant faces: behavioral and electrophysiological evidence from nulliparous adults
26	Nina	Goll	Influence of maternal metabolism on neonate eating behavior
27	Rebecca	Greenberg	Cold adaptation of mechanosensation in a mammalian hibernator
28	Hannah	Grotzinger	Mapping neurovascular adaptations across pregnancy: Insights from the Maternal Brain Project
29	Roberta	Haddad-Tóvolli	Pregnancy reshapes dopaminergic circuitries and induces food craving-like behaviours
30	Madelene C.	Holm	Structural brain changes during hormonal transition periods
31	Hannah	Oppenheimer	Investigating shared risk factors of pregnancy-related disorders and brain disorders using genetic approaches
32	Bradley	Jamieson	Preoptic circuit remodelling underlies alloparental care in juvenile mice
33	Rachel-Ann	Jones	Mapping Asb4: maternal imprinting in the parental hub neurons of the MPOA
34	David	Keller	Experience-dependent regulation of social and parental behaviors by the oxytocin receptor-expressing neurons in the lateral septum
35	Olha	Khymenets	Profile of steroid metabolites in human breast milk in different stages of lactation.
36	Olha	Khymenets	Dynamics of salivary steroidome throughout the course of pregnancy.
37	Pilyoung	Kim	The prospective associations between prenatal socioeconomic risks and postpartum brain responses to infant cries among new birthing parents
38	Annika	Koeck	Investigating the brain CRF and OXT systems in the nucleus accumbens: implications for poor mothering in lactating rats
39	Carina Julia	Koeppel	Association of hippocampal volume and treatment outcome in postpartum depression
40	Harika	Kosaraju	Long-term effects of postnatal clomipramine exposure on central aminergic systems in a postpartum rat model of obsessive-compulsive disorder
41	Kumi	Kuroda	Bio-psycho-social background factors of near-lethal child maltreatment cases in Japan: common features with offspring desertion / attack in mammals
42	Hannah	Lapp	Disruption of bidirectional dam-pup interactions following gestational bisphenol exposure

43	Angélique	Lebert	The Still-Face Effect on Mother–Infant Interpersonal Distance: Behavioral and Psychological Correlates
44	Joseph	Lonstein	Exposure to pups increases serotonin release in the female mouse nucleus accumbens
45	Eduard	Maier	Oxytocin-mediated cortical plasticity underlying maternal bodily adjustments during nursing
46	Carla	Márquez Muñoz	Neural processing of adult vs infant faces in mothers of children with autism spectrum disorder: An ERP study of N170 and P2 responses and their association with maternal sensitivity.
47	Carla	Márquez Muñoz	Assessment of neuropsychiatric behavioral traits in CD-1 mice induced by maternal immune activation
48	Daniel	Martin de Blas	Brain-age changes during human pregnancy and postpartum
49	Gloria	Matte-Bon	Leveraging brain sex classification models in the limbic system to investigate female health across the lifespan
50	Clare	McCormack	Widespread decreases in gray matter volume and increases in brain iron concentration in human pregnancy: A case-control study
51	Jamie	McQuillan	A prolactin-sensitive neural circuit that gates infanticidal behavioural in male mice
52	Briana	McRae	Brain-wide neural activity enhancing auditory-guided maternal behavior
53	Taryn	Meinhardt	The role of midbrain dorsal raphe CRFR2 in postpartum caregiving and affective behaviors
54	Sara B.	Mitchell	Coordinated neural activity over the maternal experience: Exploring maternal electrical dynamics and the impact of early life stress
55	Élisabeth	Morin	Longitudinal pathways from maternal depressive symptoms to child outcomes: The role of maternal self-efficacy and sex-specific effects
56	Ayako	Nakaki	Effect of Mediterranean diet intervention during pregnancy on maternal brain: a secondary analysis of the IMPACT BCN randomized clinical trial.
57	Philip	Newsome	Decoding the fathering brain: discrete neural responses to infant and familiar stimuli in first-time fathers
58	Lauren M.	Osborne	Neuroactive steroid biosynthesis during pregnancy predicts future postpartum depression
59	María	Paternina-Die	The hypothalamus undergoes dynamic adaptations in the transition to motherhood
60	Mikko	Peltola	Impact of parity and hormone levels on women's parasympathetic responses to infant cry
61	Sarah	Peoples	The Effects of Social Support on Mother-Infant Brain and Behavioral Interactions
62	Clara	Pérez-Gozalbo	From avoidance to maternal care: investigating the neurobiology of maternal motivation in rats
63	Koll	Rada	Strain differences in medial amygdala and medial preoptic area transcriptomic profiles in virgin male mice associated with paternal care and infanticide

64	Sandra	Sanahuja	From attraction to aggression: effects of motherhood on the response to male pheromones.
65	Michele	Santoni	Immune activation during pregnancy dysregulates maternal reward system, inducing a postpartum depressive-like phenotype in Sprague Dawley rats
66	Paul	Savoca	Differences in interoception across pregnancy and adversity exposure
67	Sara	Sheibani-Tezerji	Emotional consequences of pup loss in rat mothers: evidence for CRFR2 involvement
68	Hanneli	Sinisalo	Empathetic responses to infant emotions in mothers and non-mothers
69	Kristina O.	Smiley	Auditory responses to offspring begging calls in parental and non-parental zebra finches
70	Klara	Spalek	Pregnancy renders anatomical changes in hypothalamic substructures of the human brain that relate to aspects of maternal behavior
71	Milou	Straathof	Pregnancy alters the organization of the structural brain network
72	Eva	Unternaehrer	Parent-, parenting-, and child-related correlates of parental phubbing
73	Nati	Uriarte	Extracellular matrix, hormones, and motherhood: A complex puzzle
74	Anthony	Vaccaro	Intrinsic resting state connectivity and personal meaning across the transition to fatherhood
75	Sophie	Vanthof	Pregnancy leads to changes in social brain function
76	Sonja	Veistola	Empathic responses towards emotional child stimuli in expecting, first-time, and experienced fathers
77	Jonas	Walther	Pregnancy and the interplay between mental health and cognitive functioning
78	Franziska	Weinmar	Neural emotion regulation during pregnancy - an fMRI study investigating a transdiagnostic mental health factor in healthy first-time pregnant women
79	Grace	Williams	Analysis of oxytocin receptor gene expression in medial prefrontal cortex and alloparenting behavior in female rats with juvenile pup experience
80	Sarah	Winokur	Hypothalamic neuropeptide systems and maternal care during sickness
81	Takashi	Yamaguchi	Diverse forms of plasticity supporting maternal aggression in female mice
82	Mingyu	Yang	Neural substrates in the postpartum brain for flexible maternal care
83	Lena	Zarifoglu	Screening for familial resources and stressors in pediatric care: associations between parental mental health and child development

We look forward to welcoming you to the Parental Brain Meeting 2025 and appreciate your valuable contribution!

Should you have any questions or require clarification on any point, feel free to contact us at parentalbrain2025@teclat.com

Best regards,

The Organizers and the Technical Secretariat