SUMMARY-ESTABLISHING AN ACADEMIC CENTER

CAMPUS AND NAME OF CENTER: UNMC Research Center for Developmental Toxicology and Pharmacology

Date of proposed Center establishment: Upon Approval

Five-year Projected Expenses	Cost	**Brief Explanation**
Personnel	$ 1,080,213.00	Initial expenses include Director, faculty, postdoc, operational such as educational materials, pilot funds, core development, summer scholarships, etc.
Operating	$ 525,000.00	
Total Expenses	$ 1,605,213.00	

Five-year Projected Revenue Sources	Cost	**Brief Explanation**
Existing Funds	$ 875,000.00	The current commitment for the Center funding is for five years. The funding support will come from committed Dr. Aditya N. Bade Retention Package. Projected grants, contracts, and philantrhopic funds are estimated based on past history of successful funding.
New Public Funds	$	
Tuition and Fees	$	
Philantrhopic Contributions	$ 450,000.00	
Grants and Contracts	$ 2,550,000.00	
Other	$	
Total	$ 3,875,000.00	

AAU Recognition Potential Impact: [ ]Very Negative [ ]Negative [ ]None [X]Positive [ ]Very Positive [ ]Not Applicable

AAU Recognition Criterion Impacted (If any): Phase I, Federal Research Support

Services/Functions of Academic Center:

Conduct pioneering basic and translational research to understand the molecular and pharmacological parameters [pharmacokinetic/pharmacodynamic (PK/PD)] in mother and fetus contributing to developmental adverse conditions. Educate and train the next generation of researchers and clinicians in developmental biology, toxicology, and pharmacology. Reduce the burden of developmental disorders through accomplishing translational science, attracting high-potential candidates, and creating new jobs.

February 2, 2026

Jeffrey P. Gold, MD
President
Office of the President
University of Nebraska
3835 Holdrege Street
Lincoln, NE 68583

Dear President Gold,

I am writing in support of the creation of the **Research Center for Developmental Toxicology and Pharmacology (RCDToP)** as a new Center at the University of Nebraska Medical Center, with a proposed start date of Fall 2026.

The RCDToP aligns closely with UNMC and NU strategic priorities by advancing interdisciplinary research, education, and translational science focused on developmental health, maternal–fetal medicine, toxicology, and pharmacology. The Center will leverage existing institutional strengths and resources, advance collaboration across the NU system, and enhance our competitiveness for extramural funding while addressing significant health needs in Nebraska and beyond.

This proposal has received approval from the UNMC Vice Chancellor for Research and the Vice Chancellor for Academic Affairs. We now request your review and approval, and forward to the Board of Regents for consideration at an upcoming meeting.

Sincerely,

H. Dele Davies, MD
Interim Chancellor

cc: Jane Meza, PhD, Interim Vice Chancellor, Academic Affairs
David Jackson, PhD, Interim Executive Vice President and Provost

University of Nebraska Medical Center
Office of the Chancellor
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University of Nebraska
New Academic Center

Academic Centers include bureaus and institutes

I. Descriptive Information

Name of Institution Proposing New Center
University of Nebraska Medical Center
Name of Proposed Center
Research Center for Developmental Toxicology and Pharmacology (RCDToP)
Name of the Programs (majors) Involved
College of Medicine (COM), College of Pharmacy (COP), College of Public Health (COPH), Child Health Research Institute (CHRI), and Munroe-Meyer Institute (MMI).
Other Programs Offered in this Field by Institution
None
Administrative Unit(s) for the Proposed Center *[e.g. college, school, division, etc.]*
Department of Pharmacology and Experimental Neuroscience, College of Medicine, UNMC
Physical Location, if applicable
Durham Research Center - 1, UNMC
Date Approved by the Governing Board
Proposed Date the Center will be Initiated
Upon Approval

II. Review Criteria

A. Purpose and Context for the Center

1. Vision: To build a nationally recognized research center for advancing the understanding of underlying toxicological and pharmacological mechanisms of fetal and early post-natal developmental impairments, particularly brain and congenital abnormalities, influenced by maternal use of drugs (prescription medicines or substance use/abuse) or environmental toxicant exposures, and contributing to advancements in diagnostic and therapeutic intervention strategies to improve clinical outcomes for individuals affected by these conditions.

2. Mission Statement: To advance knowledge, diagnosis, treatment, and prevention of pharmacologic agents or environmental toxicants influenced fetal or early post-natal developmental deficits through innovative collaborations and interdisciplinary approaches for cutting-edge research and premier education programs.

3. RCDToP Core Objectives:

- Establish an integrative, multidisciplinary, and state-of-the-art research environment at the University of Nebraska Medical Center (UNMC) focused on developmental disorders.
  - The focus will be on molecular and structural neurodevelopmental deficits affecting cognition, language, learning, or intellectual abilities as well as on congenital abnormalities such as neural tube defects or congenital heart defects that are influenced by exposures to prescription medicines, substance use/abuse, or environmental toxicants during gestation or neonatal period.

- Linkage of adverse effects of drugs and environmental toxicants on “maternal or placenta health” to developmental disorders will be studied.
- Conduct pioneering basic and translational research to understand the molecular and pharmacological parameters [pharmacokinetic/pharmacodynamic (PK/PD)] in mother and fetus contributing to developmental adverse conditions.
- Synergistic influence from genetic disposition or maternal health (e.g. diabetes or obesity) to exacerbate the adverse effects of toxins on the fetal developmental outcomes will be explored.
- In addition, how other developmental impairments like congenital heart defects influenced by drugs or toxins affect the functional neurodevelopmental outcomes will be explored.
- Develop therapeutic interventions and technologies for early diagnosis, treatment, and rehabilitation.

- Educate and train the next generation of researchers and clinicians in developmental biology, toxicology, and pharmacology (graduate students, post-docs, physician scientists or junior faculties).
- Secure funding from federal research grants, private foundations, or philanthropic donations.
- Contribute to the community and economic development in the state of Nebraska by reducing the burden of developmental disorders through accomplishing translational science, attracting high-potential candidates, and creating new jobs.
- Build UNMC’s reputation as world leaders in the research field focused on developmental toxicology and pharmacology.

B. Centrality to UNMC Role and Mission

- The RCDToP strategically associates with UNMC’s iTEACH values. These are innovation and excellence for research and educational programs through inter-disciplinary collaboration and teamwork, with accountability, courage, and healing for improving clinical outcomes of children affected by developmental deficits.
- The RCDToP vision affiliates with UNMC’s vision and strategic plan 2025-28 focused on providing best education (UNMC Strategy 1.1, 1.3, 1.6, and 1.7), and research facilities and environment (UNMC Strategy 2.1, 2.2, 2.3, and 2.8) to produce world-renowned researchers and health care professionals in the field of developmental science, maternal-fetal health, toxicology, pharmacology (UNMC Strategy 3.1) while embracing richness of diversity (UNMC Strategy 5.1), advancing community engagement (UNMC Strategy 4.2 and 4.3) and economic development (UNMC Strategy 6.1 and 6.2) in the state of Nebraska.

C. Relationship of the proposal to the NU Strategy

- The RCDToP strategic plan parallels with the NU Strategic Plan Five Key Pillars.

  - Provides new educational and research opportunities for advancing innovative, inclusive and impactful educational experiences for the next generation of students in the research area of toxico-pharmacology of developmental disorders.
  - Promotes cross-disciplinary collaborative partnerships among researchers, clinicians and public health analysts working in different areas of developmental impairments, diagnostics and therapeutics to foster discovery and innovation that address critical challenges and unlock new opportunities for professional success in this area.
  - Leveraging resources wisely to achieve sustainable and far-reaching impact by developing a central collaborative space, RCDToP, for the success of faculties and students working on developmental health and disorders, toxicology, and pharmacology.
  - Welcomes, celebrates and cultivates a supportive, inclusive and dynamic environment so each member of the center can succeed.
  - The Center’s objective is to alleviate the burden of developmental disorders and thereby create impacts across our state, nation and world that result in positive rural and urban outcomes.

D. Consistency with the Comprehensive Statewide Plan for Post-Secondary Education

1. Research Program Development: To achieve the mission, RCDToP will pursue the following strategic research goals.

- Understand the underlying toxicological and pharmacological mechanisms of developmental disorders. These include pharmacological agent or environmental toxicants influenced functional or structural changes in the development of the brain or chronic congenital abnormalities during gestation or early postnatal developmental period. Causative factors of interest for these developmental disorders include, but are not limited to, illicit substance use/abuse (e.g. methamphetamine, cocaine, cannabinoids, nicotine, alcohol, and fentanyl or opioids), prescription medications (e.g. selective serotonin reuptake inhibitors (SSRIs), opioids, beta-blockers, antiepileptics, antibiotics or antiretrovirals), and air or water toxins (e.g. pesticides, nitrates, chlorpyrifos, atrazine or particulate matter 2.5).
- Develop novel non-invasive bioimaging tools (e.g. MRI, SPECT, PET), and their applications for early diagnosis of developmental deficits.
- Develop new therapeutic interventions for both treatment and prevention strategies. Focus will be kept on the development of new medicines or prodrugs with better pharmacological and efficacy properties, and novel drug-delivery systems.
- Promote state-of-the-art Artificial Intelligence (AI)-driven tools development to support early diagnosis and treatment outcomes.

2. Education and Training for Future Leaders: The center will offer inter-disciplinary educational programs to train the next generation of scientists in the area of developmental toxico-pharmacology. Special emphasis will be placed on brain/heart-developmental biology and impairments thereof. While there is no formal education curriculum proposed at this moment, focus will be placed on following activities. Such training and development of world leaders in the field of developmental health and disease will also result in attracting early-stage investigators with high potential, which would be crucial for the maintenance and growth of the RCDToP.

- Develop fetal developmental toxico-pharmacology related coursework and workshops for students and trainees.
- Conduct regular seminars (in-person and online) and make them available to all students and professional researchers of the UNMC and the NU system.
- Organize grant-writing workshops with established leaders in the field.
- Establish post-doctoral fellowships focused on cutting-edge research in developmental bio-pathology. For post-doctoral fellowships, create opportunities for professional development, and networking.
- Provide continuing education for clinicians on the latest developments in the field.
- To provide pilot funds to support cross-campus collaborations among basic and clinician scientists.
- Develop summer scholar programs for high-school and undergraduate students to raise awareness, encourage innovation and learning, and generate excitement for research.
- Establish collaborations not only with four campuses of the NU system (UNMC, UNL, UNO, and UNK) but also with other universities, hospitals, and research institutions for education and mentorship opportunities.

3. New Research Cores and Resources:

- Develop innovative core facilities to improve the availability of novel research tools, technologies and resources for the success of researchers.
  Defined short-term milestone: Novel 3D brain or placenta organoids core facility will be established at UNMC. Different types of organoids will be developed and provided to researchers to accomplish mechanistic or therapeutic goals. This unique facility will increase competitive edge of the UNMC and the NU system researchers for federal grants acquisitions.
- Develop innovative hands-on training programs within cores and among cross-disciplinary laboratories.
  Defined short-term milestone: Hands-on-training programs will be developed in collaboration with the RCDToP associated faculties and their laboratories for training next generation scientists. It will include experimentation, analysis and data conclusion from *in vitro*, *ex-vivo* and *in vivo* studies addressing questions linked to developmental science and pathology and toxico-pharmacological agents.
- New programs will be implemented at cores to help the RCDToP associated researchers in fulfilling their research needs.

Defined short-term milestone: Experiments will be performed on novel 3D brain or placenta organoids at the core according to the need of investigator. Investigators will be involved only in the study design. It would help investigators in conserving time and overall cost associated with experiments and accomplish their research goals.

As the National Institutes of Health (NIH) places growing emphasis on innovative in vitro platforms, particularly 3D organoids, developing a centralized, dedicated core facility through the RCDToP will strategically position NU investigators to remain competitive, foster collaboration, and improve success rates in securing extramural support in the field of developmental biology.

4. Research Output and Dissemination:

- Develop data-sharing protocols and centralized databases to facilitate collaboration with external researchers.
- Publish research in peer-reviewed journals.
- Present findings at national and international conferences.

E. Evidence of Need and Demand

Need and Demand for the RCDToP: Fetal or early postnatal developmental impairments induced by maternal use of drugs (prescription medicines or illicit substance use/abuse) or environmental toxicant exposures continue to be one of the major public health concerns in Nebraska, the United States, and worldwide. Exposure to these agents during pregnancy could lead to some form of neurodevelopmental or chronic congenital disorders. These developmental deficits can impact several processes such as cognition, learning, language or overall intellectual abilities, which in turn can adversely affect health, school, social outcomes or other functions required for everyday living. Such disorders not only affect the normal daily activities of children but also place a significant burden on their family members in terms of health care costs, time commitment, and mental exhaustion. However, to this date, it is not well understood how these different pharmacologic or environmental agents cause developmental deficits and thus, therapeutic interventions are not available. Moreover, due to lack of novel rapid diagnostic tools, several causative factors remain unknown.

In the United States, approximately 5% of pregnant women report using one or more addictive substances. Up to 1 in 20 school-aged children may have fetal alcohol spectrum disorders (FASDs), a range of physical, cognitive, and behavioral disorders caused by prenatal alcohol exposure. In the Nebraska, in 2020, 1.9 newborns per 1,000 hospitalized were diagnosed with neonatal abstinence syndrome, a withdrawal syndrome in infants exposed to drugs prenatally. Moreover, In 2023, more than 20% of Nebraska women of childbearing age between 18 and 44 reported binge drinking. In 2022, 3.8% of Nebraska mothers reported smoking during the last three months of pregnancy. All or each of the illicit substances used during pregnancy are potentially associated with some form of neurodevelopmental consequences such as intellectual disability, attention deficit hyperactivity disorder (ADHD), autism spectrum disorder (ASD) or chronic congenital abnormalities.

Currently, utilization of at least one prescription medication during pregnancy has reached up to 75%. However, safety of prescription medication during pregnancy for majority of medicines is unknown, largely due to lack of pregnant women inclusion in the clinical trials. Use of prescription medications like antidepressants or antiepileptics, selective serotonin reuptake inhibitors (SSRIs) or valproic acid, respectively, during pregnancy could increase the risk of developmental neurofunctional deficits such cognition or intellectual impairments, ASD or ADHD following prenatal exposures.

In addition, in the United States birth defects occur in approximately 3 percent of all live births. Nebraska exceeds the national average with birth defects occurring in around 6% percent of all live births. The findings of several studies published since 2000 indicate that birth defects may be associated with the mother's exposure to some types of agricultural compounds such as nitrate, atrazine, or arsenic in the drinking water. In these studies women who gave birth to babies with congenital abnormalities such as neural tube defects, oral cleft defects, or some form of cardiac deficiencies. In addition, elevated levels of nitrate in drinking water may increase the risk of spontaneous abortion, fetal deaths, prematurity, intrauterine growth retardation or low birth weight.

An estimated more than 10% of children experience some form of neurodevelopmental disability in the United States and the Nebraska. While specific numbers vary across different disorders, most reported conditions include ADHD, ASD, learning disabilities, intellectual disabilities, speech or language disabilities, behavioral disorders or other developmental delays. Although, linkage of pharmacologic and environmental toxicants to these developmental disabilities is well reported, direct contribution and underlying causes are unknown.

Even after several years of advancements in science, still there is a knowledge gap in the understanding of how particular pharmacologic or environmental agents cause brain developmental or chronic congenital impairments. Moreover, treatment or preventive measures and non-invasive diagnostic tools for early detection of developmental deficits are still in their infancy. Thus, due to various forms of developmental impairments, it is critical to understand the biological pathways leading to these individual disorders. Such discoveries will set the stage for the development of treatment or prevention strategies. The creation of this center will address each of these questions through multi-disciplinary, collaborative, translational research, and by providing premier education and training programs to develop young scientists and clinicians. Through these implementations, the Center's objective is to alleviate the burden of developmental disorders induced by drugs or environmental toxins and thereby, health care costs in the state of Nebraska and the United States. Successful implementation of this center will put the UNMC and NU system on the world map as the research leaders of developmental toxicology and pharmacology. As detailed in the RCDToP core objectives (above), the goals of the new center are to facilitate and advance research in developmental toxico-pharmacology in understanding causative biological pathways, developing novel research means like 3D organoids, Artificial Intelligence (AI) tools or animal models closely reflecting human neuro developmental impairments, and inventing new diagnostic tools and therapeutic agents. The Center will enhance research capacities and outputs by establishing a central platform for collaborations and educating the next generation of researchers and clinicians.

Currently, researchers from independent UNMC departments, colleges or institutions have worked on focused research areas such as biomarker or mechanistic discovery, bioimaging tool development, therapeutic drug-development or public health assessments in the area of developmental disorders and therapeutics. *However, the RCDToP will create a central collaborative space at UNMC for fostering cross-disciplinary collaboration among scientists, clinicians, and data analysts with the research focus on toxins-associated developmental disorders, diagnostic, and intervention strategies. The center will provide leadership, mentoring and infrastructure necessary to build on existing research excellence at the UNMC.* The inclusion of clinical faculties will foster and facilitate clinical fellows to participate in projects conducted in the research laboratories. This relationship will have co-operative advantage as not only will the clinicians receive training in basic research, but reciprocally, the basic scientists will also benefit from the expertise and experience of the clinicians, together moving the field forward. Such complementary, multidisciplinary collaborative efforts will lead to translational research, leading to improvements in healthcare outcomes of children suffering with developmental disorders influenced by pharmacologic or environmental toxicants. While the foundation for this research is in play, the successful integration of efforts from distinct fields of developmental toxico-pharmacology and cross-disciplinary collaborations would advance science and place the UNMC and the NU system at the national forefront.

F. Organizational Structure and Administration

1. Faculty and Staff:

- **Director:** Aditya N. Bade, PhD; Assistant Professor of Pharmacology and Experimental Neuroscience, UNMC.
  - Aditya N. Bade, PhD, will commit 25% of his efforts (0.25 FTE) as the Director of the RCDToP. Dr. Bade is a Joseph P. and Harriet K. Gilmore Distinguished Scientist. His research primarily focuses on neurodevelopmental toxicology and pharmacology, with extensive experience in immunology and virology related to human retroviruses. Dr. Bade's current work explores the mechanisms behind antiretroviral drugs (ARVs)-induced adverse neurodevelopmental outcomes and aims to develop strategies to enhance drug safety and therapeutic efficacy during pregnancy. With numerous peer-reviewed publications in esteemed journals like Nature Materials, Dr. Bade maintains a highly productive research profile focused on neurodevelopmental health and disorders and has a strong record for successfully mentoring young researchers including post-docs, medical students, PhD students, and college or high-school scholars. His work on developmental toxicology and

pharmacology has been supported by multiple intra- and extramural grants, including the successful acquisitions of several R-level grants (around $7.5 million support) from NIH institutions including Eunice Kennedy Shriver National Institute of Child Health and Human Development (NIH/NICHD) and the National Institute on Drug Abuse (NIDA). Overall, Dr. Bade is well qualified to lead this program as the Director.

- In addition, Dr. Liu, professor of the department of radiology with complementary expertise in developing new non-invasive bioimaging applications for studying neuropathology and therapeutic outcomes for several neuro-disorders and to date. He has successfully acquired several individual and group-based NIH grants and also has experience of helping other centers at UNMC. Dr. Liu, an active and advisory board member (details below), will commit 15% of his efforts (0.15 FTE) to support the RCDToP establishment, maintenance and growth.
- Additionally, a full-time Assistant Professor (1.0 FTE) with expertise in developmental toxico-pharmacology will be hired in Year 3 to support the further growth of the center.
- Furthermore, non-teaching staff will be part of the proposed unit. (1) Manjeet Kumar, PhD (Postdoctoral Research Associate; professional staff) will dedicate 100% of his efforts (1 FTE) to the creation of educational material and first research core facility within the first 3 years of the unit establishment. (2) TBA- Administrative Support Staff Member (he/she) will dedicate 50% of efforts (0.5 FTE) during initial 2 years to create a webpage and maintain the unit. A full-time Administrative Support Staff Member (1.0 FTE) will be hired in Year 3 to support the growth and expansion of the unit.

- **Participating Faculties:**

<u>The following faculties will be active participants at the RCDToP. Support letters from each faculty are attached, explaining their expertise, achievements and how each member will contribute to the establishment and growth of the RCDToP.</u>

1) Ann L. Anderson Berry, MD, PhD; Chief and Professor of Division of Neonatology; Executive Director of Child Health Research Institute, UNMC. (Advisory Board Member)
2) Karoly Mirnics, MD, PhD, Director, Munroe-Meyer Institute and Professor of Psychiatry, Biochemistry & Molecular Biology, UNMC. (Advisory Board Member)
3) Howard E. Gendelman, MD; Chair and Professor of Pharmacology and Experimental Neuroscience, UNMC. (Advisory Board Member)
4) Corey Hopkins, PhD; Professor of Pharmaceutical Sciences and Director of Center for Drug Design and Innovation, UNMC. (Advisory Board Member)
5) Anna Dunaevsky, PhD; Professor of Department of Neurological Sciences, UNMC, and Director of Cognitive Neuroscience of Development & Aging Center
6) Shilpa Buch, PhD; Professor of Pharmacology and Experimental Neuroscience, UNMC, and Director of Nebraska Center for Substance Abuse Research
7) John S. Davis; Professor of Department of Obstetrics and Gynecology, and Director of Nebraska Center for Women's Health Research
8) Benson Edagwa, PhD; Professor of Pharmacology and Experimental Neuroscience Department, UNMC. (Advisory Board Member)
9) Yutong Liu, PhD; Professor of Radiology and Director of Bioimaging Core Facility, UNMC. (Advisory Board Member)
10) Mystera Samuelson, PhD; Assistant Professor of Environmental, Agricultural & Occupational Health, and Director of Animal Behavior Core, UNMC. (Advisory Board Member)
11) Chad Abresch, PhD; Chair and Associate Professor of Health Promotion, UNMC. (Advisory Board Member)
12) Fang Yu, PhD; Professor of Biostatistics and Director of Center for Collaboration on Research Design & Analysis, UNMC. (Advisory Board Member)
13) Dongming Peng, PhD; Associate Chair of the Electrical and Computer Engineering Department, University of Nebraska – Lincoln (UNL)
14) Majid Jadidi, PhD; Assistant Professor of Department of Biomechanics, University of Nebraska-Omaha (UNO)
15) Joe (Xinqiu) Yao, PhD; Assistant Professor of Department of Chemistry, UNO

16) Adam R. Cassidy, PhD, LP, ABPP; Associate Professor of Psychology & Pediatrics, Mayo Clinic - Rochester

- Overall, Dr. Bade, other faculties, and staff are well qualified to lead this program as a leading research center for developmental toxicology and pharmacology.
- For the initial 2 years, existing facilities, resources, and collaborations will be leveraged to establish the center. This will assure wise and efficient utilization of existing resources and collaborations to achieve sustainable and far-reaching impact on the development of a new unit, RCDToP, for the success of faculties and students working on developmental health and disorders. As Dr. Bade and sixteen other faculties are participating in supporting the unit, efficient implementation with existing resources and equipment is feasible during initial period. From Year 3, expansion of the unit is expected with the hiring of more personnel directly under the RCDToP and successful acquisition of funds for long term support and growth (details in budget sheets).
- Additionally, the committed funds are from Dr. Bade's retention package (details in budget sheets) and the early phase of RCDToP establishment is utilizing existing resources for efficient implementation, there will not be any impact on the existing programs or units and their budgetary support. This approach will complement the existing units by avoiding any impact on existing distribution of funds and any duplication of resources. Rather, this strategic approach will be built on existing research excellence at UNMC and will help to bring in more resources and opportunities for next generation researchers and will put the UNMC and NU system on the world map as the research leaders of developmental toxicology and pharmacology.
- **This implementation plan strongly parallels the NU Strategic Plan Five Key Pillars.**

2. UNMC Administration Support: The Research Center for Developmental Toxicology and Pharmacology (RCDToP) will be established under the leadership of Dr. Aditya N. Bade (Director of the Center) and the application has received the approval of UNMC Administration. Please see the approval memos provided by the dean of college of medicine, the vice chancellor research, and the department chair, and support letters.

G. Partnerships with Business

- Not applicable.

H. Collaborations with Higher Education Institutions External to the University

Collaborative Partnerships:

A) Collaborations Within the UNMC and the Nebraska University (NU) System:

- Create a central collaborative space at UNMC for fostering cross-disciplinary collaboration among scientists, clinicians, and data analysts with the research focus on developmental toxicology and intervention strategies. The RCDToP will provide a central platform for existing and future research including, but not limited to, College of Medicine (COM), College of Pharmacy (COP), College of Public Health (COPH), Child Health Research Institute (CHRI), and Munroe-Meyer Institute (MMI). This approach will build a new bridge of collaborations among clinicians, basic scientists and public health experts, advancing translational medicine.
- The center will extend this research platform for accomplishing cross-disciplinary collaboration among other universities, institutions, and research centers of the Nebraska University (NU) system. We already have ongoing collaborations with researchers at department of Radiology, department of Health Promotion, department of Biostatistics, and department of Obstetrics and Gynecology at UNMC, department of Electrical and Computer Engineering and department of Nutrition & Health Sciences at UNL, and department of Biomechanics and department of Chemistry at UNO. The Center will further solidify these interactions as we expect to extend the research platform and cross-train early-stage investigators in neurodevelopmental toxico-pharmacology.
- Organize annual symposia and workshops to exchange knowledge and stimulate collaborations among scientists, clinicians, and data analysts of UNMC and the NU system.

- Work with existing UNMC centers, institutions or research core facilities to stimulate collaborations focusing on different aspects of development toxicology including biomarker discovery, bioimaging tools and therapeutic drug developments. These include CHRI, MMI, Center for Drug Design and Innovation, Center for Collaboration on Research Design and Analysis, Center for Neurodegenerative Disorders, Cognitive Neuroscience of Development & Aging Center (CoNDA), Nebraska Center for Substance Abuse Research, and research cores including Bioimaging, Behavioral science, Bioinformatics, and different Omics platforms.

B) Collaborations Outside of the UNMC and NU System:

- We already have an ongoing collaboration with Dr. Adam Cassidy from Mayo Clinic, MN. Notably, in collaboration with Dr. Cassidy (Mayo Clinic, MN), we already received R01 grant from NIH/NICHD to study effects of antiretrovirals on pre- and post-natal neurodevelopment. We will further foster such collaborations at a national level with other research centers, academic institutions, and hospitals that are specializing in developmental toxicology to stay on the cutting edge, facilitate knowledge exchange, share resources and collaborate on a large scale.

I. Constituencies to be Served

Novel discoveries created by the RCDToP-linked investigators will pave the way for the future early diagnoses and underlying mechanisms of developmental disorders influenced by pharmacologic or environmental toxicants. These innovations will set the platform for the development of novel therapeutic or preventive strategies for individuals affected by these conditions. This will have clinical relevance and a major impact on healthcare in Nebraska and the United States. The students, post-doctoral fellows and junior faculties focused on developmental biology, maternal-fetal health, toxicology, and pharmacology research will benefit from this Center.

J. Anticipated Outcomes, Significance, and Specific Measures of Success

1. Yearly Needs Assessment and Evaluation: The Director and the advisory board members will conduct annual review of the Center's activities, progress and make recommendations for the future growth and development of the Center. The following standards will be considered for the evaluation and needs assessment.

- **Assessment of Existing Resources:**
  - Review ongoing research in developmental toxicology and pharmacology at UNMC.
  - Evaluate available facilities, labs, and technologies.
  - Assess the ongoing status of interdisciplinary collaboration.
- **Gap Analysis:**
  - Identify gaps in developmental toxico-pharmacology research capacity at UNMC and the NU system.
  - Determine areas of high potential impact based on existing resources and research trends.
  - Examine regional, national, and global research trends and opportunities.
- **Community and Healthcare Needs:**
  - Gather data on the prevalence and impact of developmental disorders influenced by drugs or toxic agents in the state of Nebraska with the help of COPH experts.
  - Engage with healthcare providers to understand needs and unmet clinical challenges.
- **Short-Term and Long-Term Evaluation Metrics:**
  - Establish quantitative key performance indicators (KPIs) for the center's success, such as research publications, grant funding, and educational outcomes.
  - Regularly review funding and resource allocation to ensure sustainability.
  - Establish a long-term endowment or funding mechanism for continued growth and innovation.
- **Annual Review and Strategic Planning:**
  - Conduct an annual review of the Center's goals and performance.
  - Adjust RCDToP Core Objectives based on evolving research trends and needs.

2. Timeline and Milestones:

- **Short-Term Milestones (Year 1-3):**
  - Create a website for the RCDToP with clear messaging about vision, mission, and core objectives.
  - Develop key collaborations focused on developmental toxico-pharmacology and therapeutics among colleges, centers, institutions, and cores at UNMC and the NU system.
  - Establish an online platform to highlight RCDToP members with their expertise allowing researchers and clinicians to find other complementary investigators to collaborate with and develop positive teamwork.
  - Launch initial research and educational programs for trainees.
  - Secure initial funding for the center.
  - Successfully conduct seminars and symposiums.
  - Establish 3D brain or placenta organoid core facility.
  - Develop data-sharing protocols and centralized databases for the RCDToP members and publish findings in high-impact journals.
  - Develop social media presence to engage with the community, share findings, and promote events.
  - Conduct yearly needs assessment and evaluations.

- **Long-Term Milestones (Year 4-5):**
  - Expand research efforts, clinical integration, and partnerships.
  - Expand core leadership team, international collaborations, and research networks.
  - Establish a robust training program for next generation scientists.
  - Develop partnerships with industry and foundations for translational research.
  - Secure long-term funding through center-specific grants, endowment funds, philanthropic donations, and commercialized research.
  - Establish a long-term community engagement network.
  - Build a reputation as a center of excellence in developmental toxicology and pharmacology.

K. Potential for the Center to contribute to Society and Economic Development

Contribution to Society and Economic Development: The establishment of the RCDToP will enhance the capability for conducting developmental toxicology and pharmacology research in the state of Nebraska. It is expected that RCDToP will foster translational research to improve developmental outcomes which in turn will contribute to reducing the burden of neurodevelopmental disorders in Nebraska. Moreover, local outreach of the Center to raise awareness about developmental toxicology research would provide community benefits. Increase in number of investigators funded with extramural grants will not only have an impact on accelerating research related discoveries but also create new jobs, attract high-talent candidates, and contribute to the state economy.

L. Adequacy of Resources:

1. Faculty/Staff

- Please see the details provided above in “Organizational Structure and Administration”.

2. Physical Facilities and Equipment

The RCDToP will be established and guided by eighteen faculties (Director, Advisory Board members, and Participating Faculties) and their staff. Currently, the existing facility and resources are adequate to initiate the center. The Center will be physically located in the department of Pharmacology & Experimental Neuroscience (PEN) at the 3rd floor of the Durham Research Center – 1 (DRC-1), UNMC. Required laboratory and office space on the same floor is currently available for the Center, and if needed, additional laboratory and office space will be requested. Current animal housing space in the department of Comparative Medicine in DRC-1/2 will be used

to complement the proposed work. If needed, additional animal housing space will be requested. The laboratories in the PEN department are well equipped with instruments to conduct investigations in this field.

3. Budget Projections *[include Table 1 and Table 2]*

- Table 1: Projected Expenses
- Table 2: Revenue Sources for Projected Expenses

  - Please see the details below and attached Budget documents.

Budget Projections and Plan for Future Funding Acquisition: The current commitment for the Center funding is for five years. The funding support will come from committed Dr. Aditya N. Bade Retention Package 2024/25. It was supported by multiple sources at UNMC including Department of Pharmacology and Experimental Neuroscience, College of Medicine Dean's Office, Vice Chancellor for Research Office, Child Health Research Institute, and the foundation. In addition, for maintenance and future growth, the following actions will be implemented to secure projected funding. Please see the attached budget files for the details on committed and projected funds.

- **Funding Sources**:
  - Secure seed funding from the university, including internal grants and institutional support, government grants, private foundations, or philanthropic donations.
  - Apply for federal research grants from agencies like the NIH (National Institutes of Health), particularly from the Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD), the National Institute of Neurological Disorders and Stroke (NINDS), National Institute on Drug Abuse (NIDA), or National Institute of Environmental Health Sciences (NIEHS).
  - Explore state and local funding opportunities, particularly those targeting development toxicology-associated medical and public health research.
  - Identify and apply for federal and private grants for both investigator-initiated and center-specific funding opportunities.
- **Industry Partnerships:**
  - Explore potential partnerships for technology development, clinical trials, and commercialization.
- **Private and Philanthropic Donations**:
  - Launch fundraising campaigns targeting donors, with specific focus on individuals and families affected by developmental conditions. Host events and leverage social media to raise awareness and attract support.
- **Endowment Fund**:
  - If feasible, create an endowment fund to ensure long-term sustainability.

TABLE 1: PROJECTED EXPENSES - NEW ORGANIZATIONAL UNIT
Research Center for Developmental Toxicology and Pharmacology (RCDToP)

	(FY_2026-27) Year 1		(FY_2027-28) Year 2		(FY_2028-29) Year 3		(FY_2029-30) Year 4		(FY_2030-31) Year 5		**Total**	
Personnel	**FTE**	Cost	FTE	Cost	FTE	Cost	FTE	Cost	FTE	Cost	**FTE**	**Cost**
Faculty [1]	0.4	$54,734	0.4	$55,828	1.4	$146,944	1.4	$149,882	1.4	$152,879	1.4	$560,267
Non-teaching staff: Professional [2]	1	$61,977	1	$63,217	1	$64,481	1	$65,770	1	$67,085	1	$322,530
Graduate assistants		$0		$0		$0		$0		$0	0	$0
Non-teaching staff: support	0.5	$29,243	0.5	$29,828	1	$45,205	1	$46,109	1	$47,031	1	$197,416
Subtotal	1.9	$145,954	1.9	$148,873	3.4	$256,630	3.4	$261,761	3.4	$266,995	3.4	$1,080,213
Operating												
General Operating [3]		$25,000		$25,000		$125,000		$150,000		$200,000		$525,000
Equipment [4]		$0		$0		$0		$0		$0		$0
New or renovated space [5]		$0		$0		$0		$0		$0		$0
Library/Information Resources [6]		$0		$0		$0		$0		$0		$0
Other [7]		$0		$0		$0		$0		$0		$0
Subtotal		$25,000		$25,000		$125,000		$150,000		$200,000		$525,000
Total Expenses	1.9	$170,954	1.9	$173,873	3.4	$381,630	3.4	$411,761	3.4	$466,995	**3.4**	**$1,605,213**

Explanation:

For the initial 2 years, existing facilities, resources, and collaborations will be leveraged to establish the center. This will assure wise and efficient utilization of existing resources and collaborations to achieve sustainable and far-reaching impact on the development of a new unit, RCDToP, for the success of faculties and students working on developmental health and disorders.

Notes:

[1] Both (1) Dr. Aditya N. Bade, the Director of the center will dedicate 25% of individual efforts (0.25 FTE) and (2) a Professor, Dr. Yutong Liu, the memebr of the RCDToP, will dedicate 15% of individual efforts (0.15 FTE) to implement and maintain the unit. (3) Additionally, a full time Assistant Professor (1.0 FTE) will be hired in Year 3 to support the further growth of the center. Increases in years 2-5 represent incremental increase in base salary at 2% per year. Proposed salary includes benefits.

[2] Following non-teaching staff are included: (1) Manjeet Kumar (Postdoctoral Research Associate; professional staff) will dedicate 100% of his efforts (1.0 FTE) for creation of educational material and first research core facitlity within first 3 years of the unit establishment. (2) TBA- Administrative Support Staff Member will dedicate 50% of efforts (0.5 FTE) during initial 2 years to create the webpage and maintain the unit. A full times Administrative Support Staff Member (1.0 FTE) will be hired in Year 3 to support the growth and expansion of the unit. Increases in years 2-5 represent incremental increase in base salary at 2% per year. Proposed salary includes benefits.

[3] General Operating expenses for the center include (1) Teaching/Educational Material, (2) Organoid Core development, (3) Seminars/Symposium/Workshop/Invited Speakars, (4) Pilot funds for early stage investigators, (5) Summar scholarship program for high-school and undergraduate students (6) Website development, (7) Recruitment expense, (8) Advertising, (9) EAC travel/Honorarium, (10) Computer/Office Equipments, (11) Other miscellaneous expenses for overal coordination of the Center's activities.

[4] No equipment is currently anticipated. Dr. Bade and sixteen other faculties are participating to support the unit. Thus, for efficient use of resources, existing equipment will be utilized for initial period and no requirement of the new instrument is anticipated at this time.

[5] No addional space is currently requested.

[6] No library or other information resources are anticipated.

TABLE 2: REVENUE SOURCES FOR PROJECTED EXPENSES - NEW ORGANIZATIONAL UNIT

Research Center for Developmental Toxicology and Pharmacology (RCDToP)

	(FY 2026-27) Year 1	(FY 2027-28) Year 2	(FY 2028-29) Year 3	(FY 2029-30) Year 4	(FY 2030-31) Year 5	**Total**
Existing Funds [1]	$175,000	$175,000	$175,000	$175,000	$175,000	**$875,000**
Required New Public Funds [2]	$0	$0	$0	$0	$0	**$0**
1. State Funds	$0	$0	$0	$0	$0	**$0**
2. Local Funds	$0	$0	$0	$0	$0	**$0**
Tuition and Fees [3]	$0	$0	$0	$0	$0	**$0**
Other Funding [4]	$0	$0	$0	$0	$0	**$0**
1 Extramural Grants			$850,000	$850,000	$850,000	**$2,550,000**
2 Donations			$150,000	$150,000	$150,000	**$450,000**
3						**$0**
Total Revenue [5]	**$175,000**	**$175,000**	**$1,175,000**	**$1,175,000**	**$1,175,000**	**$3,875,000**

Explanation:

[1] These funds will be allocated from the Dr. Aditya N. Bade Retention Package 2024/25 (Committed). As the committed funds are from Dr. Bade's retention package and the early phase of RCDToP establishment is utilizing existing resources for efficient implementation, there will not not be any impact on the exiting programs or units and their budgetary support. This approach will complement the existing units by avoiding any impact on existing distribution of funds and any duplication of resources.

[2] There is no requirement for additional public funds.

[3] There will be no tuition fee revenues to support this unit.

[4] Other Funding: Extramural Grants from National Institutes of Health (NIH/NICHD/NINDS/NIDA/NIEHS) and private donations (Projected). Starting from Year 3, $1 million year are expected through successful aquisitions of competative NIH grants and private donations. Currently. Dr. Bade has brought around $7.5 million through competative NIH grants during last 4 years, and has several NU level collaborative grants in pipeline, assuring the acqusition of projected funds.

[5] Revenues are not expected to match expenses.

February 2, 2026

H. Dele Davies, MD
Interim Chancellor, University of Nebraska Medical Center

Dear Interim Chancellor Davies:

I am writing to formally convey my support for the establishment of the **Research Center for Developmental Toxicology and Pharmacology (RCDToP)** as a new Center at the University of Nebraska Medical Center, with a proposed initiation in Fall 2026.

The proposed RCDToP, to be administratively housed within the Department of Pharmacology and Experimental Neuroscience in the College of Medicine, represents a strategically important initiative that aligns strongly with UNMC's academic mission, iTEACH values, and the University of Nebraska system's strategic priorities. The Center's mission is: "To advance knowledge, diagnosis, treatment, and prevention of pharmacologic agents or environmental toxicants influenced fetal or early post-natal developmental deficits through innovative collaborations and interdisciplinary approaches for cutting-edge research and premier education programs."

The Center brings together faculty expertise across the College of Medicine, College of Pharmacy, College of Public Health, Child Health Research Institute, and the Munroe-Meyer Institute, and is well positioned to advance innovative, collaborative research and educational opportunities. Under the leadership of Dr. Aditya N. Bade, the Center demonstrates strong potential for extramural funding, impactful scholarship, and meaningful contributions to workforce development and clinical translation. Dr. Bade has committed support for the first two years, and a strong history of obtaining extramural funding to support his work. No additional resources are needed to establish this center.

Based on the strength of the proposal, the demonstrated administrative and academic support, and the alignment with UNMC's strategic goals, I fully support the establishment of the Research Center for Developmental Toxicology and Pharmacology and respectfully recommend its approval. Please let me know if additional information is needed.

Sincerely,

Jane L Meza

Jane Meza, Ph.D.
Interim Vice Chancellor, Academic Affairs
University of Nebraska Medical Center

COLLEGE OF MEDICINE
Office of the Dean

University of Nebraska Medical Center

September 4, 2025

RE: Establish of Research Center for Developmental Toxicology and Pharmacology (RCDToP)

Dr. Bade:

I am writing to provide confirmation of my strong support for your proposal to establish a Research Center for Developmental Toxicology and Pharmacology (RCDToP) under your leadership. Neurodevelopmental disorders are broad in number and impact individuals across the age spectrum. The cause of most of these disorders is poorly understood and treatments are often non-existent or suboptimal. Understanding the pathogenesis of these disorders is critical to identifying means to treat and prevent them.

As outlined in your proposal, UNMC is blessed to have a critical mass of faculty and staff whose research, educational and clinical interests include a broad range of neurodevelopmental disorders. Thus, UNMC is in an excellent position to pursue interdisciplinary efforts to advance our knowledge of these conditions and ultimately develop treatment or prevention strategies for them.

Once fully implemented, the RCDToP will bring expertise from around the campus to advance science related to these conditions and provide opportunities for education of students and our community in them. The Center will provide an opportunity for new extramural funding sources for research and serve as a catalyst to attract talented new faculty and trainees, further enhancing the national reputation of our university.

Thus, the UNMC College of Medicine strongly endorses your application. As you know we have recently committed $450,000 to you over 5 years to enhance your research and support the establishment of the RCDToP. We look forward to working with you to make the RCDToP a reality and will of course consider additional investment as needed.

Sincerely,

Bradley Britigan

Bradley E. Britigan, MD
Stokes-Shackleford Professor and Dean, UNMC College of Medicine

985520 Nebraska Medical Center / Omaha, NE 68198-5520
402-559-4204 / FAX 402-559-9798

August 29, 2025

Aditya Bade, Ph.D.
Department of Pharmacology and Experimental Neuroscience
College of Medicine
University of Nebraska Medical Center
984388 Nebraska Medical Center
Omaha, NE 68198-4388

Dear Dr. Bade,

As Vice Chancellor for Research at the University of Nebraska Medical Center, I enthusiastically support your application to the University of Nebraska Board of Regents to form the Research Center for Developmental Toxicology and Pharmacology (RCDToP). Your proposal is both timely and needed, and I applaud your vision for taking on one of the most difficult challenges of modern biomedical science.

As you describe, there is a wealth of talent at UNMC, and across the NU system, in the neurological sciences and the time is right to bring your research interests and expertise into the fold in a way that makes the “whole greater than the sum of the parts”. Your vision to 1) establish a multidisciplinary research environment focused on toxicological and pharmacological mechanisms of fetal and early post-natal developmental impairments, 2) develop therapeutic interventions and technologies for early diagnosis, treatment, and rehabilitation, and 3) educate and train the next generation of neurodevelopmental researchers and clinicians is exactly what a BoR-approved Center is meant to do. However, if you are successful in achieving these three goals, you will be well on your way to reaching your last goal to “build UNMC’s reputation as a world leader in the research field focused on neurodevelopmental science and disorders”. But have no doubt, this will require strong leadership, not only within the NU system, but within the broader neurodevelopmental research community.

I look forward to hearing of your successful proposal and watching you build a successful program to address this important area of research. As you pursue your career objectives, please know that I would be happy to help along the way.

Sincerely,

Kenneth W. Bayles, Ph.D.
Vice Chancellor for Research

September 1, 2025

Aditya N. Bade, PhD
Department of Pharmacology and Experimental Neuroscience
College of Medicine, University of Nebraska Medical Center 984388
Nebraska Medical Center Omaha, NE 68198-4388

Dear Aditya,

It is my honor and privilege to provide unconditional support for the development of your research center. I pledge to provide the needed guidance for all parts of your new initiative. Your progress in this proposal has been nothing less than spectacular. You have developed a renowned laboratory from scratch. All of us are incredibly proud of these singular accomplishments. Your seminal work investigating the influences of antimicrobial drugs, viral infections, and the environment on neurodevelopment is laudatory. You have built highly relevant, impactful, and unique laboratory initiating a new field of research that interfaces the disciplines of HIV/AIDS, developmental neurobiology. Your work more broadly reflects inherent adverse events and drug-drug toxicities yet to be discovered and reflecting treatments of a broad spectrum of infectious disorders. For the center, the foundation is built from questions of how common medicines impact birth defects, which have long been held of significant relevance. The clear associations between medicine usage, in pregnant women or those of childbearing age, and fetal development require clarity. The work you have already built stands on prior research exploring the association between deficits in neurodevelopment and disease prevention. The scientific impact questions were forged through your leadership. These innovations solidly link timely developmental needs with new opportunities for collaboration and integration, making our university ever stronger. With the new center, you plan to extend a strong foundation of prior work to explore the effects of other pharmacologic or environmental agents and to ensure healthy fetal development. Importantly, your work exploring novel therapies shows that they can facilitate therapeutic drug delivery to the mother while providing a means to attenuate neurotoxicity. The science uncovered will certainly have a profound impact on long-term, broad safety counseling during pregnancy. As you chair and without doubt, I enthusiastically support the new University of Nebraska Board of Regents (BoR) in forming the Research Center for Developmental Toxicology and Pharmacology (RCDToP). Your proposal is timely and will interact with many related programs throughout our campuses and beyond. Established programs throughout the NU system in developmental biology, toxicology, pharmacology, drug development, translational medicine, and clinical care will form the basis of this multidisciplinary research that with other centers in neurodegenerative diseases will develop novel BoR-approved programs. This new initiative will certainly continue to build our university's reputation and provide a timely step forward towards improving the need to optimize fetal development on a global scale. We look forward to watching new successes building upon an already successful program.

Sincerely,

Howard E. Gendelman

Howard E. Gendelman, MD
Chairperson

University of Nebraska Medical Center
Department of Pharmacology and Experimental Neuroscience
Nebraska Medical Center | Omaha, NE 68198-5800 | phone: 402.559.8920 | fax: 402.559.3744 |

Child Health
Research Institute

University of Nebraska Medical Center
Children's NEBRASKA

August 30, 2025

Aditya N. Bade, PhD
Assistant Professor
Department of Pharmacology and Experimental Neuroscience
College of Medicine
University of Nebraska Medical Center
Omaha, NE 68198

Dear Dr. Bade,

It is with great enthusiasm that I write to support the College of Medicine's application for an University of Nebraska Center the "Research Center for Developmental Toxicology and Pharmacology (RCDToP)". As the Executive Director of the Child Health Research Center at UNMC and Children's Nebraska, and a Professor in the Department of Pediatrics, Division of Neonatology, I have an acute understanding of the significant need for this center. Too many of our pediatric patients suffer from developmental disorders, brain, heart or chronic congenital anomalies, influenced by exposures to a variety of pharmacological or environmental factors for which prevention, interventions and therapeutics are unavailable. Strong collaboration with CHRI and the center is highly likely given the nature of research interests of CHRI investigators and the details presented in the plan below. As an active CHRI investigator you well know the value of bringing together investigators including clinicians and clinician scientists to strengthen the research we conduct in the critical areas of developmental disorders.

This proposed center will bring a much-needed focus for advancing therapeutic discovery to UNMC and the greater Nebraska educational system. The center's vision to be a leading research center for advancing the understanding of underlying toxicological and pharmacological mechanisms of fetal and early post-natal developmental impairments, particularly brain and congenital abnormalities, fostering innovative research, and contributing to advancements in diagnostic and therapeutic intervention strategies to improve clinical outcomes for individuals affected by these conditions aligns clearly with clinical needs of pediatric patients and their families in Nebraska. Additionally, this vision will help amplify the expertise of our current UNMC investigators working in these fields. This center will be a powerful tool for recruitment of faculty as well.

The Center's mission includes those items that are critical to understanding and then treating or preventing fetal or early post-natal developmental deficits. These include: 1. Advancing knowledge, 2. Developing treatments, 3. Establishing preventative measures to decrease the number of children impacted by these disorders. I envision the Center will be working closely with the existing Centers and cores on the UNMC campus to synergize the activities and

enhance the efforts of faculty members' research. The Center will bring much needed focus to this important research area. Thank you for your invitation to serve on the advisory board of the Center, I look forward to working closely with the newly formed Center and actively participating in its activities and research mission.

The Center will include different aspects of research in developmental disorders and highlight opportunities for impactful discovery. Specific areas of opportunity include birth injury and hypoxic ischemic injury, opioid exposure's impact on neurodevelopment, neuroimaging to assess brain development after clinical interventions, ADHD and other neurological behavioral disorders just to list a few. The resources for the center to partner with institutes like CHRI and MMI in addition to evaluating therapeutics through the UNMC Center for Drug Design and Innovation are robust, and I and the other members of your proposed center's advisory board are well positioned to ensure robust collaboration from the start. It is important to note that although all these efforts already occur at UNMC but, having a Center that can help to organize and promote the activities will be a catalyst for increased research activity and extramural funding. The Center and the leadership will also provide guidance and education on developmental biology, maternal-fetal health, toxicology, and pharmacology across multiple models, which will aid in bringing further focus to individual researchers' efforts to attract external support for funding.

As such, please find this letter to be evidence of my strong support for the development of the RCDToP at UNMC.

Sincerely,

Ann L Anderson Berry, MD, PhD
Professor (Tenure), Pediatrics
Executive Director, Child Health Research Institute
Vice-President of Research Children's Nebraska
Vice-Chair Research, Department of Pediatrics
Division Chief, Neonatology
Medical Director, Nebraska Perinatal Quality Improvement Collaborative
Sparks Chair of Pediatric Research
University of Nebraska Medical Center
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Karoly Mirnics, MD, PhD
Dean and Director,
Munroe-Meyer Institute for Genetics and Rehabilitation
Hattie B Munroe Professor of Psychiatry, Biochemistry & Molecular Biology,
Pharmacology & Experimental Neuroscience
MMI Director Office, Rm 40101A

August 31, 2025

Aditya Bade, PhD
Assistant Professor
Department of Pharmacology and Experimental Neuroscience
College of Medicine
University of Nebraska Medical Center
Omaha, NE 68198

RE: Letter of Support for the Research Center for Developmental Toxicology and Pharmacology

Dear Aditya,

I am writing with high enthusiasm to support the establishment of the new research center focused on developmental biology, called the "Research Center for Developmental Toxicology and Pharmacology (RCDToP)" at the University of Nebraska Medical Center (UNMC). I am a Hattie B. Munroe Professor of Psychiatry, Biochemistry & Molecular Biology at UNMC, and Dean and Director of the Munroe-Meyer Institute (MMI). Research on neurodevelopmental disorders is closely aligned with my research interests and achievements. My research focuses on several key areas to deepen our understanding of developmental brain disorders. I investigate molecular changes across various human brain disorders, utilizing advanced transgenic animal and cell culture models to explore both neurodevelopmental and psychiatric conditions. My research examines how interactions between genes and environmental factors affect brain development. Moreover, we explore the effects and side-effects of prescription medications on the developing brain and body of the unborn child, and how individual genetic variants influence this process. Thus, with extensive experience in the research area of neurodevelopmental pathobiology, I affirm the timely need for a new research center at UNMC focused on advancing the understanding of drugs or toxins-linked developmental disorders, fostering innovative multidisciplinary research, and contributing to advancements in diagnostic and therapeutic intervention strategies to improve clinical outcomes for individuals affected by these conditions.

The RCDToP's focus will be on neurodevelopmental or chronic congenital disorders including pharmaceutical drugs, substance use, or environmental toxicants influenced alterations in the development during gestation or the developmental period post-birth. My work on schizophrenia and autism has been evident. I have characterized immune system dysfunction in schizophrenia and autism, pioneered *in situ* proteomics in neuroscience, and developed a new microarray platform. Moreover, I hold a patent for RGS4 as a schizophrenia susceptibility gene and developed a novel transgenic mouse technology using BAC-driven, miRNA-mediated silencing *in vivo*. With long term scientific expertise and experience, my goal will be helping RCDToP members with

addressing scientific questions, obtaining NIH grants, developing new educational and training programs, and guiding the next generation of researchers of this field.

Importantly, one of the missions of MMI is to improve the lives of individuals with developmental and intellectual disabilities. Thus, there is strong collaboration potential between MMI and RCDToP members. RCDToP will create a platform which will allow multi-disciplinary collaboration between MMI researchers with other researchers across UNMC and the NU system. These collaborations will spread across numerous fields including mechanistic discoveries, new drug or diagnostic tool developments, and public-health data and policy assessments. The RCDToP will fill the current existing gap at UNMC and help researchers and clinicians associated with neuro or congenital developmental disorders to be more successful in achieving their goals and be a leading research center for developmental toxicology and pharmacology in the United States.

Altogether, I strongly support the establishment of RCDToP. I am very excited and looking forward to working with you and the esteemed advisory board members to ensure the success of the center.

Sincerely,

Károly Mirnics, MD, PhD
Hattie B. Munroe Professor
Dean and Director, Munroe-Meyer Institute for Genetics and Rehabilitation
Professor of Psychiatry, Biochemistry & Molecular Biology
University of Nebraska Medical Center
Omaha, NE 68198-5450

September 4, 2025

Aditya N. Bade, PhD
Assistant Professor
Department of Pharmacology and Experimental
Neuroscience College of Medicine
University of Nebraska Medical
Center Omaha, NE 68198-5800

RE: Research Center for Developmental Toxicology and Pharmacology (RCDToP)

Dear Aditya,

I am writing this letter to provide strong support for the establishment of the Research Center for Developmental Toxicology and Pharmacology (RCDToP) at the University of Nebraska Medical Center (UNMC). Through my extensive research experience in drug discovery and as a Professor of Pharmaceutical Sciences and Director of the UNMC Center for Drug Design and Innovation (CDDI), I affirm the critical need for a new research center focused on advancing our understanding of developmental disorders linked to drugs or environmental toxicants at UNMC. RCDToP's objectives are to conduct pioneering basic and translational research to understand underlying causes for developmental disorders, particularly brain and congenital deficits, develop new therapeutic molecules and diagnostic tools, and educate the next generation of researchers and clinicians in this area. These will be achieved through building a central multi-disciplinary collaborative research platform at UNMC and will be extended to the NU system. Upon successful establishment, the Center will drive novel translational research, procurement of extra-mural grants, and joining of new exceptional talent and in turn will build UNMC's reputation as leaders in the research field focused on developmental toxicology and pharmacology.

The development of therapeutic strategies for treatment and prevention of developmental disorders strongly aligns with my expertise and the capabilities of the CDDI. My primary research interests are related to the design, synthesis and optimization of biologically active small molecules as *in vivo* probes, drug discovery lead compounds, and preclinical drug candidates. My research has been focused on designing novel positive allosteric modulators related to numerous central nervous system (CNS)-related therapeutic areas. Thus, utilizing my expertise for drug discovery to treat neurodevelopmental disorders is a natural extension. In addition, I am the founding Director of the Center for Drug Design and Innovation (CDDI) at UNMC. CDDI is the campus-wide drug discovery enterprise of the UNMC. Our mission is to catalyze the formation of multidisciplinary teams of scientists and clinicians that collaborate to translate scientific discoveries and clinical observations into new therapies for areas of unmet medical need. Thus, a strong collaboration between CDDI with the proposed new center on developmental disorders (RCDToP) is expected. I and the CDDI members would work closely with the RCDToP members, particularly, for pushing boundaries to develop new drug molecules for treatment as well as for prevention purposes. Through CDDI, I will help to enhance and promote UNMC's drug discovery capabilities in the research areas of a wide array of developmental disorders like autism spectrum disorder (ASD). I and the CDDI members will collaborate with RCDToP to develop and advance all stages of drug discovery projects from basic discovery (target identification/validation, hit-to-lead optimization) to translational efforts.

In addition to CDDI, you have received strong support from institutes like Child Health Research

Institute (CHRI), and Munroe-Meyer Institute (MMI), and College of Public Health (COPH), in which several researchers are involved in research associated with developmental biology, and pharmacological and environmental compounds-linked developmental deficits. Thus, I and the other members of the proposed center's advisory board are well positioned to ensure robust collaboration for the successful growth of the RCDToP. I look forward to working closely with the new Center and actively participating in its research mission.

Sincerely,

Corey R. Hopkins, Ph.D., FRSC
Professor and Interim Chair
Department of Pharmaceutical Sciences
Director, UNMC Center for Drug Design and Innovation
College of Pharmacy
University of Nebraska Medical
Center Omaha, NE 68198-6125

University of Nebraska Medical Center

September 12, 2025

Aditya N. Bade, PhD
Assistant Professor
Department of Pharmacology and Experimental Neuroscience
University of Nebraska Medical Center
Omaha, NE 68198

RE: Research Center for Developmental Toxicology and Pharmacology (RCDToP)

Dear Aditya,

I am writing to provide my support for the initiation of a new center called the "Research Center for Developmental Toxicology and Pharmacology (RCDToP)" at the University of Nebraska Medical Center (UNMC). I am Professor of the Department of Neurological Sciences at UNMC and the Director of the Cognitive Neuroscience of Development & Aging Center (CoNDA). Neurodevelopmental health and disorders are closely aligned with my research interests. My research focuses on several aspects of developmental brain disorders and understanding the underlying cellular and molecular mechanisms of the formation, maintenance and modification of synapses in the brain. Central to my work is the use of experimental models for human neurodevelopmental disorders such as autism spectrum disorders, Fragile X Syndrome (FXS) and the study of learning induced changes in synaptic structure and function. Moreover, my research explores the effects of maternal immune activation (MIA) on neurodevelopmental outcomes. MIA is a potential risk factor for both autism and schizophrenia; thus, my laboratory has been studying how behavior as well as synaptic structure and function is affected in MIA offspring. As one of the leaders in the research field of neurodevelopmental pathobiology, I affirm that the new research center at UNMC which would be focused on advancing the toxicological and pharmacological understanding of drugs or toxins- exposure-induced developmental disorders and developing interventional strategies would complement the CoNDA Center which focuses on neural mechanisms of brain function and disorders in development and aging.

The RCDToP's focus will be on neuro or chronic congenital disorders that are influenced by maternal use of pharmaceutical drugs or substance use, or exposure to environmental toxic contents. The center establishment will foster multidisciplinary research and develop novel diagnostic and therapeutic or preventive means to improve clinical outcomes for individuals affected by these conditions. As a developmental neuroscientist and director of the CoNDA, I will help RCDToP members in obtaining extramural grants, developing new educational programs, and guiding the next generation of basic science or physician researchers of this field.

Currently, several researchers work on different aspects of developmental toxico-pharmacology and maternal-fetal interface at UNMC; however, the central platform created by RCDToP will fill the existing gap at UNMC and NU system by helping researchers and clinicians whose work is focused on drugs or toxins-influenced neuro or congenital developmental disorders to be more successful in achieving their goals and be a leading researchers of developmental toxicology and pharmacology in the United States.

985960 Nebraska Medical Center / Omaha, NE 68198-5960
402-559-1071 / FAX: 402-559-2256 / adunaevsky@unmc.edu

Altogether, I support the establishment of RCDToP. I am very excited and looking forward to working with you and RCDToP members.

Sincerely,

Anna Dunaevsky, PhD
Professor
Department of Neurological Sciences
Director of Cognitive Neuroscience of Development & Aging Center (CoNDA)
University of Nebraska Medical Center

985960 Nebraska Medical Center / Omaha, NE 68198-5960
402-559-1071 / FAX: 402-559-2256 / adunaevsky@unmc.edu

University of Nebraska Medical Center
NEBRASKA'S HEALTH SCIENCE CENTER
A Partnership with The Nebraska Medical Center

DEPARTMENT OF PHARMACOLOGY AND
EXPERIMENTAL NEUROSCIENCE

August 25, 2025

Aditya N. Bade, PhD
Assistant Professor
Department of Pharmacology and Experimental Neuroscience
University of Nebraska Medical Center
Omaha, NE 68198-5800

RE: Research Center for Developmental Toxicology and Pharmacology (RCDToP)

Dear Aditya,

With high enthusiasm, I am writing this letter to support the new initiation and much needed establishment of the Research Center for Developmental Toxicology and Pharmacology (RCDToP) at the University of Nebraska Medical Center (UNMC). As a Professor of the Department of Pharmacology and Experimental Neuroscience and founding Director of the Nebraska Center for Substance Abuse Research, I stand with you in the creation of a new research center at UNMC focused on developmental disorders linked to pharmacologic agents or environmental toxicants during pregnancy or early development.

Advancing the understanding and developing therapeutic strategies for treatment and prevention of substance use-linked health issues aligns with my expertise and the mission of the Nebraska Center for Substance Abuse Research. Our center is committed to facilitating trans-disciplinary research in the area of substance abuse and its consequences on the biological functioning within the central nervous system, with the ultimate goal of developing therapeutic strategies aimed at preventing and treating drug addiction and the associated co-morbidities. One of the major co-morbidities which is understudied and requires urgent attention is the effects of substance use on fetal development following exposure during pregnancy. Direct and indirect effects from maternal and placental deficits due to substance use on developmental processes such as brain, heart or structural changes are unknown and thus the therapeutic interventional or preventive means are still in their infancy. Thus, on behalf of our center members, I affirm that we are very excited for the collaboration with the RCDToP. This collaboration would be very productive to achieve professional success in terms of research advancements, federal research grant acquisitions, and training of next generation basic science or clinical physician researchers whose research is focused on substance use and their toxicologic and pharmacologic effects on fetal development. There is no doubt in my mind that the successful establishment of the RCDToP will build UNMC's reputation as leaders in the research field focused on developmental toxicology and pharmacology.

Overall, I am excited to collaborate with you and the RCDToP members and ensure the successful establishment and the growth of the proposed center. I look forward to working closely with you and actively participating in achieving the RCDToPs' research mission.

Sincerely,

Shilpa Buch

Shilpa Buch, Ph.D.
Professor and Senior Executive Vice Chair for PEN
Director- Nebraska Center for Substance Abuse Research
Dept of Pharmacology and Experimental Neuroscience (PEN)
University of Nebraska Medical Center - DRC 8008
Omaha, NE 68198-5880

University of Nebraska Medical Center
NEBRASKA'S HEALTH SCIENCE CENTER

Director of Research and Development
Department of Obstetrics and Gynecology
Leland J. and Dorothy H. Olson Center for Women's Health

August 31, 2025

Aditya N. Bade, PhD
Assistant Professor
Department of Pharmacology and Experimental Neuroscience
University of Nebraska Medical Center Omaha, NE 68198

RE: Letter of Support for the Research Center for Developmental Toxicology and Pharmacology

Dear Aditya,

I am writing this letter to provide a strong support for the establishment of the new research center called, the "Research Center for Developmental Toxicology and Pharmacology (RCDToP)" at the University of Nebraska Medical Center (UNMC). I am a Professor of the UNMC Department of Obstetrics and Gynecology, and the founding Director of Nebraska Center for Women's Health Research. I am also the Director of Research and Development for the Olson Center for Women's Health and Division Director for research in the Department of Obstetrics and Gynecology.

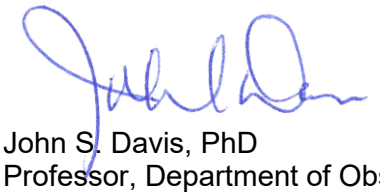
My research interest lies in the area of cellular and molecular biology with a focus on women's reproductive health and disease pathogenesis. In addition, several faculty members of the Nebraska Center for Women's Health Research are focused on studying women's health, placenta bio-pathology, and reproductive toxicology. The objective of our Center is to promote multidisciplinary women's health research activities at the University of Nebraska to prevent, diagnose, and treat women's health issues (infertility, preterm birth, osteoporosis, cancers, menopause, cardiovascular disease, mental health, and health disparities). Thus, research on developmental disorders or maternal-fetal interface is closely aligned with my and our center's research interests and achievements. A strong and successful collaboration is expected between Nebraska Center for Women's Health Research and RCDToP members.

The RCDToP's focus will be on neurodevelopmental or chronic congenital disorders influenced by direct exposure to pharmaceutical drugs, substance use or environmentally influenced alterations. Moreover, studying association of maternal health influenced by drugs or environmental contaminants on fetal outcomes is one of the key objectives. Thus, with extensive experience in the research area of women's health, I affirm the timely need for a new research center at UNMC focused on advancing the understanding of drugs or toxins-linked developmental disorders, fostering multidisciplinary research, and developing novel diagnostic and therapeutic intervention strategies. Through my extensive scientific experience, I will help RCDToP members for addressing research problems, obtaining extramural grants, and developing new educational programs for the next generation researchers of developmental toxicology and pharmacology.

RCDToP will create a platform which will allow inter-disciplinary collaboration with our center members and other researchers across UNMC and the NU system. These collaborations will explore numerous scientific fields such as mechanistic discoveries, new drug or diagnostic tool developments, and policy assessments. The RCDToP will fill the current existing gap at UNMC and help researchers and clinicians focused on developmental disorders to be more successful in achieving their goals and be a leading research center for developmental toxicology and pharmacology in the United States.

I strongly support the establishment of RCDToP. I am very excited and looking forward to working with you and the center members.

Sincerely,



John S. Davis, PhD
Professor, Department of Obstetrics and Gynecology
Director of Nebraska Center for Women's Health Research
Senior Research Career Scientist, Omaha VA Medical Center
Director of Research and Development, Olson Center for Women's Health
College of Medicine
University of Nebraska Medical Center Omaha, NE 68198

University of Nebraska Medical Center

NEBRASKA'S HEALTH SCIENCE CENTER
A Partnership with Nebraska Health System

DEPARTMENT OF PHARMACOLOGY AND EXPERIMENTAL NEUROSCIENCE

08/22/2025

Aditya N. Bade, PhD
Department of Pharmacology and Exp. Neuroscience
University of Nebraska Medical Center

Dear Dr. Bade,

I am glad to provide my strongest support and commitment to serve as an advisory board member on your proposed Research Center for Developmental Toxicology and Pharmacology (RCDToP). The proposed center is timely and will support our recently funded NIH/NIAD multidisciplinary and multi-institutional R61 grant focused on developing ultra-long acting dose flexible safe and effective formulations for pediatric patients living with HIV-1 infection. The center will also be a critical reseource for our ongoing other funded work and other new initiatives in finding better treatments for malaria, tuberculosis and life-saving medicines that will help manage the opioid crisis, type 2 diabetes and chronic pain. Notably, our team here at UNMC has identified a medicine that could be taken once every year to prevent malaria, one of the leading causes of death among children and pregnant women in developing countries. RCDToP will help us understand the safety profile of this medicine at molecular level as we prepare for translational studies. We have also identified what could be the longest acting medicine that will be used to manage the opioid crisis and chronic pain. Opioid overdose deaths remain high and according to the US CDC, more than 115 people die each day from opioid-related overdose in the US. RCDToP will be a critical resource that will improve our understanding of the developmental safety profile of this life saving therapy.

Overall, your proposed RCDToP will not only unravel molecular mechanisms that could possibly lead to development of novel therapies to mitigate drugs or toxins influenced neurodevelopmental or congenital abnormalities but also foster crossdisciplinary collaborations and training of the next generation of researchers and clinicians in developmental toxico-pharmacology. Your past success, leadership and experience in establishing a new successful program in antiretroviral induced neurodevelopmental deficits at UNMC, strong molecular biology background, outstanding infrastructure for research at UNMC, your ongoing independed and collaborative research projects with basic scientists and clinicians on drug induced neuronal function alterations in brain subregions and the most recent work where for the first time you demonstrated the links between dolutegravir, a broadly utilized antiretroviral therapy, and inhibition of matrix metalloproteinases activities provides your propopsed Center a strong strategic framework for moving forward.

I have an extensive background in the areas of drug delivery, medicinal chemistry and pharmacology that includes development of new strategies for the synthesis of biologically active natural products and their unnatural analogs. The goal of my collaborative research is to transform frequently administered therapies into novel ultra-long-acting safe medicines that can be dosed once-every-six-months or even once-a-year to facilitate prevention and treatment of persistent illnesses such as HIV infection, viral hepatitis, tuberculosis, malaria, addiction to opiates, chronic pain and cardiometabolic diseases. In summary, I am very excited about your proposed RCDToP and look forward to our continued collaboration.

Sincerely,

Benson J. Edagwa, PhD
Professor
Department of pharmacology and Experimental Neuroscience
University of Nebraska Medical Center

University of Nebraska Medical Center

COLLEGE OF MEDICINE
Department of Radiology

September 2, 2025
Aditya N. Bade, PhD
Assistant Professor,
Department of Pharmacology and Experimental Neuroscience
University of Nebraska Medical Center
Omaha, NE

Subject: Letter of Support for the Research Center for Developmental Toxicology and Pharmacology (RCDToP)

Dear Aditya,

I am pleased to provide my full support for the establishment of the Research Center for Developmental Toxicology and Pharmacology (RCDToP) at the University of Nebraska Medical Center (UNMC). As the Director of the Preclinical MRI Core Facility and a Professor in the Department of Radiology, I recognize the critical need for a dedicated research center focused on advancing our understanding of developmental disorders, particularly, brain and congenital disorders that are induced by gestational exposures to pharmaceutical drugs, substance use or water or air pollutants. The RCDToP's mission to drive innovative research, develop early diagnostic tools, and foster interdisciplinary collaboration strongly aligns with my expertise and the capabilities of the Preclinical MRI Core Facility.

The Preclinical MRI Core Facility at UNMC is a state-of-the-art imaging center equipped with two high-field (7T) small-animal MRI systems that provide advanced capabilities for neuro, cardiac or placenta developmental research. The facility supports a broad range of imaging methodologies including, but not limited to, diffusion tensor imaging (DTI) for mapping white matter connectivity in neurodevelopmental models, functional MRI (fMRI) and resting-state connectivity analysis to investigate neural circuit abnormalities, chemical exchange saturation transfer (CEST) MRI for non-invasive molecular imaging of metabolic disruptions, manganese-enhanced MRI (MEMRI) for assessing neuronal activity and connectivity changes during early brain development, and intravoxel incoherent motion (IVIM) imaging for perfusion estimate in placentas. Our data analysis laboratory, equipped with high-performance Dell Precision 7920 workstations, provides a suite of cutting-edge software tools such as BrainVoyager, FSL, SPM, and VivoQuant, enabling sophisticated neuroimaging analysis to support RCDToP research initiatives. Additionally, our RF Workshop and 3D Printing capabilities facilitate the development of customized imaging tools tailored to developmental studies.

As the Director of the Preclinical MRI Core Facility, I am committed to providing RCDToP researchers with access to cutting-edge imaging technologies, expertise in data analysis, and collaborative research opportunities to support the center's goals. Furthermore, I will actively contribute to the advisory board of RCDToP, helping shape its strategic direction and fostering collaborations across disciplines.

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I strongly believe that the establishment of RCDToP will significantly enhance UNMC research infrastructure and position it as a leader in developmental toxicology and pharmacology. I look forward to supporting this initiative and collaborating with RCDToP investigators to drive meaningful advancements in the field.

Sincerely

Yutong Liu, PhD

Professor, Radiology Department
Director, Preclinical MRI Core Facility
University of Nebraska Medical Center
Telephone: (402)559-8340
E-mail: yutongliu@unmc.edu

Aditya N. Bade, PhD
Assistant Professor
Department of Pharmacology & Experimental Neuroscience
Durham Research Center
985800 Nebraska Medical Center
Omaha, NE 68198-5800

September 3rd, 2025

Subject: Research Center for Developmental Toxicology and Pharmacology (RCDToP)

Dear Dr. Bade:

I am writing to express my enthusiastic support for the development of the Research Center for Developmental Toxicology and Pharmacology (RCDToP), here at the University of Nebraska Medical Center (UNMC). It is my firm belief that the development of this center would be a significant asset to the university's research community, by providing investigators with the targeted support and resources needed to advance the research field of developmental science, toxicology, and pharmacology. As the Director of the Animal Behavior Core and an assistant professor in the department of Environmental, Agricultural, and Occupational Health at UNMC, I recognize the critical need for the development of a dedicated research center focused on developmental disorders at our institution. In my role as director, I interact with a wide range of investigators who focus on neurodevelopmental disorders, all of whom would benefit from the development of this center. Further, as an investigator in the field of behavioral neuroscience, I feel that this center will provide unique opportunities to expand the focus of my research to new and exciting topics in the field of developmental neuroscience and toxico-pharmacology through multidisciplinary collaboration at UNMC.

The Animal Behavior Core Facility is a biomedical research facility located within the UNMC Comparative Medicine facility. The core contains dedicated, controlled procedural space for cognitive and behavioral assays to be conducted with mice and rats. We also provide support for work conducted with other species including but not limited to nonhuman primates, hamsters, swine, rabbits, etc. The core offers access to a wide range of behavioral and cognitive assays, including both equipment and software such as Noldus Ethovision and ANY-Maze which enables investigators to collect and code data in real time. Further, the core provides access to otherwise cost prohibitive resources such as access to a NVivo miniscope which provides Ca+ channel imaging for free behaving rodents, an advanced telemetric array with specialized software to monitor sleep, activity levels, and seizures, and an auditory and vestibular testing apparatus. Our wide range of cognitive and behavioral assays are standardized and designed to evaluate concepts ranging from spatial reasoning, learning, short and long term memory, fear conditioning, physiological and vestibular function, nociception, and others.

As the director of the Animal Behavior Core, I am dedicated to enhancing the success of our investigators through detailed consultations, custom assay design, assistance with grant writing and IACUC protocols, as well as hands on training in both data collection and analysis. We also provide full service options for both data collection and analysis.

In the over four years that we have worked together, I have found your holistic approach to the study of neurodevelopmental disorders to be inspiring. You have a unique ability to bring together teams of researchers from across disciplines, to answer questions that are critical to the treatment and diagnosis of developmental disorders. I am excited to continue our collaborations, as well as join the Advisory Board for the center. In this role, I look forward to assisting you and my fellow board members in developing this center and helping it to thrive.

Sincerely,

Mystera M. Samuelson, PhD
Assistant Professor
Environmental Agricultural and Occupational Health Department
Director
Animal Behavior Core
985875 Nebraska Medical Center
Omaha NE 68198-5875
mystera.samuelson@unmc.edu

August 19, 2025

Aditya N. Bade, PhD
Assistant Professor, Department of Pharmacology and Experimental Neuroscience
University of Nebraska Medical Center
Omaha, NE

Re: Letter of Support for the Research Center for Developmental Toxicology and Pharmacology

Dear Aditya,

I am pleased to provide my enthusiastic support for the establishment of the Research Center for Developmental Toxicology and Pharmacology (RCDToP) at the University of Nebraska Medical Center. As Chair of the Department of Health Promotion and a member of the proposed Advisory Board, I recognize the critical importance of advancing our understanding of developmental disorders through interdisciplinary research.

The RCDToP's vision to become a leading research center for advancing understanding of pharmacologic and environmental toxicants influenced developmental disorders, particularly brain and congenital abnormalities, aligns perfectly with our institutional commitment to addressing significant public health challenges through collaborative research. In my role as Department Chair, I've witnessed firsthand the impact that developmental disorders have on families and communities throughout Nebraska. The establishment of this dedicated center will significantly enhance our ability to address these challenges through innovative research approaches.

The Department of Health Promotion is particularly well-positioned to contribute to the RCDToP's mission through our expertise in community engagement, health behavior and systems research, and population health assessment. Our faculty can provide valuable perspectives on the social determinants that influence developmental outcomes and help translate research findings into meaningful community interventions.

I am committed to supporting the RCDToP through my service on the Advisory Board, collaborating on grant opportunities, and facilitating connections with community partners. The interdisciplinary approach proposed by the Center represents exactly the kind of innovative collaboration needed to make meaningful progress in understanding and addressing drugs or toxins induced complex developmental disorders.

I look forward to working with you and the other Advisory Board members to ensure the success of this important initiative.

Sincerely,

Chad Abresch, PhD
Weitz Family Chair of Health Promotion College of
Public Health
University of Nebraska Medical Center

University of Nebraska Medical Center

Department of Health Promotion
984355 Nebraska Medical Center | Omaha, NE 68198-4355 | cabresch@unmc.edu
unmc.edu

August 29, 2025

Aditya N. Bade, PhD
Assistant Professor
Department of Pharmacology and Experimental Neuroscience
University of Nebraska Medical Center
Omaha, NE 68198

Subject: Letter of Support for the Research Center for Developmental Toxicology and Pharmacology (RCDToP)

Dear Dr. Bade,

With great enthusiasm, I am writing to support the creation of the Research Center for Developmental Toxicology and Pharmacology (RCDToP) at the University of Nebraska Medical Center (UNMC). As a Professor of Biostatistics and Director of the Center for Collaboration Research on Design and Analysis (CCORDA), I assert the need for a new and unique research center advancing the research linked to developmental disorders induced by drugs and environmental toxicants at UNMC.

My experience as a biostatistician is broad and extensive including both basic and clinical research for different diseases. I have multiple years of consulting experience on design and data analysis for clinical trials, laboratory-based, or high-dimensional omics research and have been the biostatistician for many NIH-funded projects. Further, my leadership role for the successful establishment and growth of several research organizations is strong. At UNMC, I serve as co-director of the Clinical Research Design, Epidemiology and Biostatistics KCA of the Great-Plains IDeA-CTR, and co-director of the Biostatistics Shared Resource (BSR) of the Fred & Pamela Buffett Center (FPBCC). I have also been directing the Center for Collaboration Research on Design and Analysis (CCORDA) at UNMC since 2014. The mission of the CCORDA is to provide expertise in the quantitative sciences, including biostatistics, epidemiology, and health services research, as well as geospatial analysis, surveys, observational and qualitative studies. Thus, through CCORDA, I will coordinate the biostatistical services including study design, planning, conduct, analysis and interpretation of data analysis results with RCDToP members for the success of researchers in terms of conducting research focused developmental toxicology and pharmacology and obtaining extra-mural grants. In addition, collaboration of CCORDA with RCDToP will develop and provide new educational and training opportunities for basic science, public health, clinical, and translational investigators focused on research associated with neuro and congenital developmental disorders like ADHD, autism spectrum disorders, neural tube or cardiac defects, etc. Thus, such multi-disciplinary collaborative efforts will help to accomplish the mission of the RCDToP, “advance knowledge, treatment, and prevention of pharmacologic or environmental agents influenced developmental disorders through innovative collaborations and interdisciplinary approaches for cutting-edge

research and premier education programs."

It needs to be highlighted that currently researchers from independent UNMC departments or institutions work on different aspects of developmental disorders such as biomarker discovery, bioimaging tools or drug-development or public health assessments. However, the central collaborative environment and leadership for bringing all these at one place to increase the success and growth of individual and team efforts to improve clinical outcomes of individuals affected by these conditions in the state of Nebraska, the United States or worldwide is required. Thus, establishment of RCDToP at UNMC is timely. It will create a central collaborative space at UNMC for fostering cross-disciplinary collaboration among scientists, clinicians, and data analysts with research focus on brain or structural development, disorders, diagnostic, and intervention strategies. As emphasized in the application, while the foundation for this research is in play, the successful integration of efforts from distinct fields of developmental science, toxicology and pharmacology, and cross-disciplinary collaborations would advance the science and place UNMC and the NU system at the national forefront.

Overall, I look forward to working closely with you and the advisory board members to ensure the accomplishments of RCDToP's vision and mission.

Sincerely,

Fang Yu, Ph.D.
Director, Center for Collaboration on Research, Design and Analysis
Professor, Department of Biostatistics
University of Nebraska Medical Center
Omaha, NE 68198-4375

University of Nebraska Lincoln

DEPARTMENT OF ELECTRICAL & COMPUTER ENGINEERING

August 22, 2025

Aditya N. Bade, PhD, Assistant Professor
Department of Pharmacology and Experimental Neuroscience University of Nebraska Medical Center, Omaha, NE

Subject: Letter of Support for the Research Center for Developmental Toxicology and Pharmacology (RCDToP)

Dear Aditya,

It is with great enthusiasm and strong institutional commitment that I write to express my full support for the establishment of the Research Center for Developmental Toxicology and Pharmacology (RCDToP) at the University of Nebraska Medical Center (UNMC). As the Associate Chair of the Department of Electrical and Computer Engineering in the College of Engineering at the University of Nebraska - Lincoln, I recognize the tremendous value this center will bring not only to our university system, but also to the broader scientific, clinical, and educational community.

Developmental disorders associated with maternal use of drugs (prescription medicines or substance use/abuse) or environmental toxicant exposures represent a significant and growing challenge across the nation and particularly within our own state. Conditions such as autism spectrum disorder, ADHD, intellectual and learning disabilities affect millions of children and families, often resulting in lifelong impacts on health, education, and quality of life. The RCDToP's vision to address these challenges through interdisciplinary research, cutting-edge technology, and comprehensive education is not only timely but essential.

From an engineering perspective, I see immense potential for meaningful collaboration between RCDToP and our faculty, staff, and students. The convergence of biomedical science and engineering is increasingly central to solving today's most pressing health problems. In particular, our department has developed strong interests in areas such as:

- Biomedical signal processing for brain activity monitoring and neurodevelopmental assessment
- Neural interface design and wearable technologies for therapeutic and rehabilitative support
- AI and machine learning algorithms for pattern recognition in diagnostic imaging and behavioral analysis
- Embedded systems and Internet of Things (IoT) platforms for real-time monitoring of developmental health
- Data security and health informatics, ensuring ethical handling and integration of sensitive clinical and genetic data

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http://engineering.unl.edu/ece

Each of these areas offers opportunities for collaboration with RCDToP in developing innovative diagnostic tools, assistive technologies, and computational models that can transform the way developmental biology is understood and managed.

The RCDToP's interdisciplinary framework will provide fertile ground for engineering faculty and students to engage in translational research—research that bridges fundamental science and clinical application. This kind of collaboration is central to the mission of the University of Nebraska and is fully aligned with our department's strategic priorities in advancing health technology innovation.

Furthermore, the Center's proposed educational and training programs for graduate students, postdoctoral scholars, and clinician-researchers are of particular interest to us. Interdisciplinary training is essential in preparing the next generation of engineers and scientists who are equipped to work at the crossroads of health and technology. We envision our students benefiting immensely from internships, joint research projects, and co-mentorship models with RCDToP investigators. We also anticipate RCDToP becoming a key partner in developing new interdisciplinary courses, certificate programs, and research fellowships.
Importantly, the RCDToP also addresses broader societal and economic needs. By reducing the burden of developmental neuro or congenital disorders through scientific discovery, technological innovation, and evidence-based care, the Center will improve the quality of life for affected individuals and families. Additionally, it will help spur economic development in Nebraska by attracting research funding, fostering biotech startups, and creating high-skill jobs.

In sum, the RCDToP initiative aligns seamlessly with the mission of our College of Engineering, and I offer my enthusiastic endorsement. I am confident that this Center will catalyze transformative advances in the field of developmental toxico-pharmacology and strengthen the University of Nebraska's national and global leadership in biomedical research and innovation.

Please do not hesitate to reach out should you require any additional information or collaboration commitments from our department. We look forward to being a strategic partner in this impactful endeavor.

Sincerely,

Dongming Peng, PhD

Associate Chair of the Electrical and Computer Engineering Department

College of Engineering

University of Nebraska – Lincoln

Phone: (402)554-4980

Email: DPENG2@UNL.EDU

University of Nebraska Omaha

DEPARTMENT OF BIOMECHANICS
Division of Biomechanics and Research Development

September 3, 2025

Aditya N. Bade, PhD
Assistant Professor
Department of Pharmacology and Experimental Neuroscience
University of Nebraska Medical Center

RE: Research Center for Developmental Toxicology and Pharmacology (RCDToP)

Dear Dr. Bade,

I am writing to offer my full support for the establishment of the Research Center for Developmental Toxicology and Pharmacology (RCDToP) at the University of Nebraska Medical Center (UNMC). This initiative aligns strongly with the University of Nebraska (UN) system's mission to foster interdisciplinary collaboration and tackle major public health challenges.

As a faculty member in the Department of Biomechanics at the University of Nebraska at Omaha (UNO), my research focuses on cardiovascular biomechanics, with an emphasis on the mechanical and structural properties of human arteries in the context of aging and disease. My lab employs computational modeling, medical device development, and experimental methods to investigate vascular disease diagnosis and treatment, and we are increasingly exploring the intersection of biomechanics with cardiac and neuro development, function and deficits.

I have an active collaboration with Dr. Bade focused on understanding vascular remodeling in the context of disease development. This partnership has already yielded valuable insights and will naturally expand through the RCDToP to address drugs or toxins-linked developmental disorders, where biomechanics and vascular remodeling processes may play a contributing role. The center's multidisciplinary environment will offer a strong foundation for broadening this research into translational applications, while also providing valuable training and collaboration opportunities for our students and early-career researchers.

In summary, I strongly support the establishment of the RCDToP and look forward to contributing through collaborative research, student mentorship, and knowledge sharing. I am confident that this center will enhance the NU system's impact on health sciences and offer meaningful advancements in the toxicological and pharmacological understanding and treatment of developmental conditions.

Sincerely,

Majid Jadidi, PhD
Assistant Professor, Department of Biomechanics, University of Nebraska at Omaha
mjadidi@unomaha.edu

University of Nebraska Omaha

DEPARTMENT OF CHEMISTRY

September 3, 2025
Aditya N. Bade, PhD, Assistant Professor
Department of Pharmacology and Experimental Neuroscience

RE: Letter of Support for the Research Center for Developmental Toxicology and Pharmacology

Dear Aditya,

It is my great pleasure to offer my full support for the establishment of the Research Center for Developmental Toxicology and Pharmacology (RCDToP) at the University of Nebraska Medical Center (UNMC). As an Assistant Professor of Computational Biochemistry at the University of Nebraska Omaha (UNO), I recognize the tremendous opportunities this center will create for collaborative research. I am enthusiastic about contributing in any way I can, both during the formation of the RCDToP and in its continued development.

I am particularly excited about the development of a multidisciplinary research environment dedicated to addressing pressing health challenges, specifically neurodevelopmental and congenital disorders which are associated with exposures to substance use, prescription medications or environmental contaminants. As a researcher with extensive interdisciplinary experience, I recognize the urgent need for such an integrated setting to effectively address complex scientific questions. While collaborative efforts currently exist, the RCDToP's mission to unify research strengths across the University of Nebraska (NU) system and external institutions will not only enhance ongoing efforts but also spark new, impactful collaborations. I also see tremendous opportunities for students in our department. As a primarily undergraduate and non-research-intensive department, our students often face challenges in securing research internships. The educational initiatives and research projects launched by RCDToP members will offer valuable training and engagement in cutting-edge research for our students.

In summary, I wholeheartedly endorse your initiative to establish the RCDToP and am committed to offering my continued support through collaboration and other meaningful contributions as appropriate.

Please feel free to reach out if you need any additional information.

Sincerely,

Xinqiu Yao

Joe (Xinqiu) Yao, PhD
Assistant Professor
Department of Chemistry
University of Nebraska Omaha
Phone: (402) 554-5894
Email: xyao@unomaha.edu

Aditya Bade, PhD
Assistant Professor
Department of Pharmacology & Experimental Neuroscience
University of Nebraska Medical Center
Durham Research Center I 3066
985800 Nebraska Medical Center
Omaha, NE 68198-5800

MAYO CLINIC

3 September 2025

Dear Dr. Bade,

I am very excited to continue our collaborative efforts and unequivocally support the creation of the Research Center for Developmental Toxicology and Pharmacology (RCDToP) at the University of Nebraska Medical Center (UNMC). As a board-certified pediatric neuropsychologist with significant experience in studying neurodevelopmental outcomes among at-risk children, I can personally attest to the importance of a center dedicated to studying developmental disorders induced by exposures to prescription medications, substance use or environmental toxicants and developing novel therapeutic and diagnostic means to improve the lives of children affected by these conditions.

We already have an active collaboration in play for studying the effects of *in utero* exposure to antiretroviral treatment (ART) on neurodevelopmental outcomes. The objective of our collaboration to date has been focused on the exchange of scientific findings from our own areas, (1) to overcome translational limitations linked to only rodent neurobehavioral observations by cross-validating findings with acquired clinical data, and (2) to overcome limitations linked to only observational studies performed in humans by identifying underlying mechanisms for cross-validating neurodevelopmental deficits in murine models which otherwise are not possible to study in humans. I am confident that our collaboration in this area will be able to contribute meaningfully to understanding how *in utero* ART exposures affect children's short- and longer-term neurodevelopmental and psychosocial outcomes. These timely findings will guide the field in developing therapeutic and preventive means to improve neurodevelopmental outcomes. Your vision about our collaboration highlights your leadership and dedication to translational research and your commitment to helping children living with developmental disorders.

In addition to continuing our collaboration, as you work to bring together the core faculty of your center, I would be very happy to explore collaborations with other members of the RCDToP and provide my expertise to help with their research goals as well. In summary, I am thrilled to endorse your initiative to establish the RCDToP at UNMC and look forward to seeing the growth of this center and contributing to this important work however I can be most helpful.
Sincerely,

Adam R. Cassidy, PhD, LP, ABPP
Department of Psychiatry & Psychology
Department of Pediatric & Adolescent Medicine
Mayo Clinic - Rochester
Associate Professor of Psychology & Pediatrics
Mayo Clinic College of Medicine and Science
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