**Cover Letter: Postdoctoral Fellow – Metabolic Homeostasis**

Dear Selection Committee,

I am interested in the Postdoctoral Fellow position in Metabolic Homeostasis at Roche's Institute of Human Biology. With my background in gut microbial biotechnology and a passion for understanding complex biological systems, I am excited about the opportunity to contribute to your innovative research at the intersection of adipose tissue biology and metabolic homeostasis.

**Research Background and Transition**

My fascination with complex biological systems has been a driving force throughout my academic career. While my doctoral research at ETH Zurich focused on "The Effect of Exogenous and Endogenous Vitamin B9 and B12 on Microbial Growth and Metabolism in the Human Gut," I see a compelling opportunity to apply my skills and knowledge to the field of adipose tissue biology and metabolic homeostasis.

Although my primary expertise is in gut microbial biotechnology, I believe that many of the techniques and approaches I've mastered are directly transferable to studying adipose tissue:

1. Experience with *in-vitro* models: My experience with anaerobic batch fermentations and *in vitro* models of the human colon has provided me with strong foundation techniques. I am eager to apply these skills to learn, develop and work with cellular and organoids of adipose tissue.
2. Analytical Techniques: During my doctoral research, I developed and utilized various analytical methods, including UHPLC-UV/MS, HPLC-RI, and GC-MS. These skills will be valuable in analyzing metabolites and signaling molecules involved in adipose tissue function and its interactions with other tissues.
3. Molecular Biology and Omics Approaches: My work involved both 16S rRNA marker-gene sequencing and metagenomic analysis. I am confident that these skills, along with my recent training in RNA-seq analysis, will be applicable to studying gene expression and signaling pathways in adipose tissue.

**Motivation and Research Vision**

The focus of your project on understanding the mechanisms by which adipose tissue interacts with other tissues to mediate whole-body energy homeostasis is fascinating. I am particularly intrigued by the potential to explore the sensory innervation of adipose tissue and its functional consequences. Building on my experience and your research goals, I propose the following research aims:

1. Developing Multicellular In Vitro Systems: Utilize my expertise in cell culture and 3D modeling to develop multicellular in vitro systems that accurately represent the interactions between adipose tissue and sensory neurons. This would involve adapting my skills in anaerobic culture to the specific requirements of adipose and neuronal cell types.
2. Characterizing Adipose-Neuron Interactions: Apply my analytical skills (e.g., UHPLC-MS/MS) to identify and quantify signaling molecules and metabolites involved in adipose-neuron communication. This would build upon my experience in metabolite profiling and method development.
3. Transcriptomic and Functional Analysis: Utilize RNA-seq and other omics approaches to characterize the transcriptional changes in both adipose tissue and sensory neurons under various conditions, such as different metabolic states or in response to specific stimuli.

**Scientific Mission and Personal Development**

My broad scientific goal is to use advanced molecular and computational techniques to understand complex biological systems and their impact on human health. While my previous work focused on the gut microbiome, I see this postdoctoral position as an exciting opportunity to expand my research scope to include adipose tissue biology and its role in metabolic homeostasis.

I am particularly motivated by the translational aspect of this research and its potential to contribute to our understanding of diabetes and other metabolic disorders. The opportunity to work in an interdisciplinary environment at Roche, collaborating with biologists, engineers, and data scientists, and mentoring junior scientists aligns with my desire to tackle complex scientific questions from multiple angles.

Moreover, I am excited about the prospect of learning new techniques specific to adipose tissue research, such as adipocyte differentiation protocols and methods for studying neuronal function. I believe that my strong foundation in molecular biology, analytical techniques, and data analysis, combined with my eagerness to learn, will allow me to quickly adapt to this new field and make meaningful contributions to your research goals.

Thank you for considering my application. I look forward to the possibility of discussing how my background, skills, and motivation align with your team's goals in advancing our understanding of metabolic homeostasis.

Sincerely,

Palni Kundra