Intellectual Merit Criterion

Overall Assessment of Intellectual Merit
Good

Explanation to Applicant
The applicant struggled when they first started their undergraduate career, but they have shown excellent improvement and currently have a strong academic transcript. The applicant illustrates amazing drive in the classroom, lab, and in their outside activities (i.e. DII track). The applicant has been doing research for several semesters and has one presentation - this is a internal presentation. The research plan is very strong for an undergraduate but overly ambitious. The applicant should continue to work in the lab and look to present and publish their work.

Broader Impacts Criterion

Overall Assessment of Broader Impacts
Excellent

Explanation to Applicant
Considering the applicant is a decorated DII athlete, the broader impact the applicant has undertaken is admirable. The applicant has been involved with the SAAC at Mines and holds leadership positions in the SAAC. The applicant works with the diversity groups on the campus to build community and support networks. The applicant has solid plans for future work and shows great promise.

Summary Comments
The applicant has begun a potential successful research career. The applicant has one internal presentation. It was not completely clear the long term goals of the applicant for graduate school, given the multiple mentions of a Masters; the fellowship is for doctoral work - this lowers the enthusiasm for the applicant. The applicant has excellent broader impact and is encourage to continue outreach and leadership on the campus and whatever graduate school they may attend. The letters of support were very strong and speak very highly of the applicant.

Intellectual Merit Criterion

Overall Assessment of Intellectual Merit
Very Good

Explanation to Applicant
Strengths: Setting up a new laboratory as an undergraduate is always impressive--for a student athlete more so-- and is a strong indicator of drive to succeed at graduate level. REU participant, strong academic record, very strong letters of recommendation as a whole. Well-thought out experimental plan that successfully demonstrates an understanding of multiple experimental approaches that could be used to Weakness: There is a bit of vagueness with regards to the type of polymers proposed to be examined and exact criteria for further investigation, but likely this is appropriate at this career stage. Another minor weakness, but the application would have benefitted from additional discussion of other considerations that might go in to determining the better polymer for RNP delivery, such as potential toxicities and how they could be measured.

Broader Impacts Criterion

Overall Assessment of Broader Impacts
Excellent

Explanation to Applicant

Strengths: Peer mentor and first-year instructor, DEI chair of Studnt Athletic Advisory Committee represents a demonstrated commitment to broadening participation; well thought-out plan for future outreach and mentorship activities at this career stage. Applicant provides a thoughtful justification for their project-- that gene editing materials require expensive equipment to remain stable, which will limit their use for economically challenged communities, similar to issues that arise during the distribution of vaccines. Weaknesses: A minor weakness, but with regards to the broader impact justification, the application would have been strengthened by a discussion of how the specific experimental system proposed (hPSCs at the APOE gene for Alzheimer's treatments) requires thermal stability in "infrastructurally and economically deficient clinical settings"-- even if the thermal stability issue is solved, does one envision there will be an immediate need CRISPR-based gene therapies for acute treatments of Alzheimers using hPSCs in those settings (since those applications are still speculative even in resource-rich environments) or are there other applications for heat-tolerant biologics delivery systems that might be more relevant or timely?

Summary Comments

A very strong application with only (very) minor weaknesses, application could have been (slightly) improved with additional experimental detail, however applicant has very high level of demonstrated potential for success at graduate level and beyond.

Intellectual Merit Criterion

Overall Assessment of Intellectual Merit

Very Good

Explanation to Applicant

The applicant has a strong research proposal with detailed experimental design, outlined success criteria, and clear rationale. It is unclear whether a 10 degree C increase in the stability range of the polymer carriers would truly eliminate the need for a -70 supply chain. That said, improved parameters for gene therapy product delivery would still make an impact in the field. The applicant's academic record could be slightly stronger, with more long-term research. However, the applicant's other commitments and later change in major are understandable reasons for slightly weaker areas.

Broader Impacts Criterion

Overall Assessment of Broader Impacts

Excellent

Explanation to Applicant

The applicant has a demonstrated record of achievement in and out of the academic setting, with a huge time commitment to the track team and research. In addition, the applicant has been the DEI chair for the student athlete advisory committee, demonstrating an interest and desire to make an impact in increasing the diversity and representation in their institution. The research statement is well written and, if successful, could demonstrate some proof of concept for improved gene therapy delivery methods. This would also be potentially enabling for greater access of gene therapies to underserved communities.

Summary Comments

Overall, a strong student-athlete-scientist with a demonstrated commitment to DEI and proven leadership skills as the track team captain since 2021.