Applied Genomics Project: Compliance Verification

Confirmation of Alignment with AG Course Requirements

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June 2025

Overview

This document confirms that the proposed project entitled *"De novo Genome Sequencing and Functional Annotation of a PLA-Degrading Fungal Isolate for Bioeconomic Innovation"* fully complies with the formal and scientific requirements set out by the Applied Genomics course, as outlined in the official course guidelines and materials.

1. Complex Genome Requirement

- The project involves a filamentous fungal strain (eukaryotic), which has a complex nuclear genome with introns, repetitive elements, and large gene families.
- This satisfies the instruction that the project must not be centered on prokaryotic or viral genomes.

2. Novel Sample Collection and DNA Production

- The strain is simulated to be isolated from a compost bin containing PLA bioplastic waste.
- The sample is original and not previously sequenced or published, thus requiring de novo sequencing and analysis.
- This aligns with the requirement to produce genomic data from newly collected biological material.

3. Genomic Focus and Exclusion of Forbidden Topics

- The project does not include RNA-seq, metagenomics, microbiota analysis, or targeted sequencing.
- The central methodology is Whole Genome Sequencing (WGS) followed by functional annotation and comparative genomics.

- Therefore, the project strictly adheres to the list of permitted approaches.

4. Structured According to Course Template

The project includes all the required sections:

1. Introduction and background
2. Clear scientific objectives
3. Materials and methods: sample source, extraction, library prep
4. Experimental design: sequencing platforms and strategies
5. Genome assembly and annotation: Flye, Pilon, BRAKER2, InterProScan
6. Analysis tools: BUSCO, eggNOG, OrthoFinder
7. Results interpretation and bioeconomic application
8. Budget table (200,000)

5. Genetic and Functional Foundation

- The project is grounded in core genomic concepts: gene prediction, domain annotation, ortholog clustering, functional inference.
- It seeks to identify gene families involved in PLA degradation (cutinase, depolymerase, lipase).

6. Applied Impact and Innovation

- The project addresses an environmental and bioeconomic challenge: plastic biodegradation.
- The focus on fungal enzymes as biotechnological tools is innovative and relevant.
- The project is fully aligned with EU Green Deal and sustainable development goals.

7. Conclusion

All structural, scientific, and methodological elements of the proposed project comply with the requirements presented in the Applied Genomics syllabus, including the official handouts on project design. The project demonstrates originality, proper use of sequencing-based genomics, and a strong applied rationale.