

Improving AAV Production with Minicircles



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Introduction

AAV vectors are central to gene therapies, yet production remains costly and complex, hampered by inefficient packaging and plasmid-related risks. PlasmidFactory provides innovative DNA technologies, including the Minicircle, to deliver higher titers, cleaner vectors, and faster, more cost-effective AAV production – enabling safer and scalable gene therapies.

Efficient 2-Plasmid System

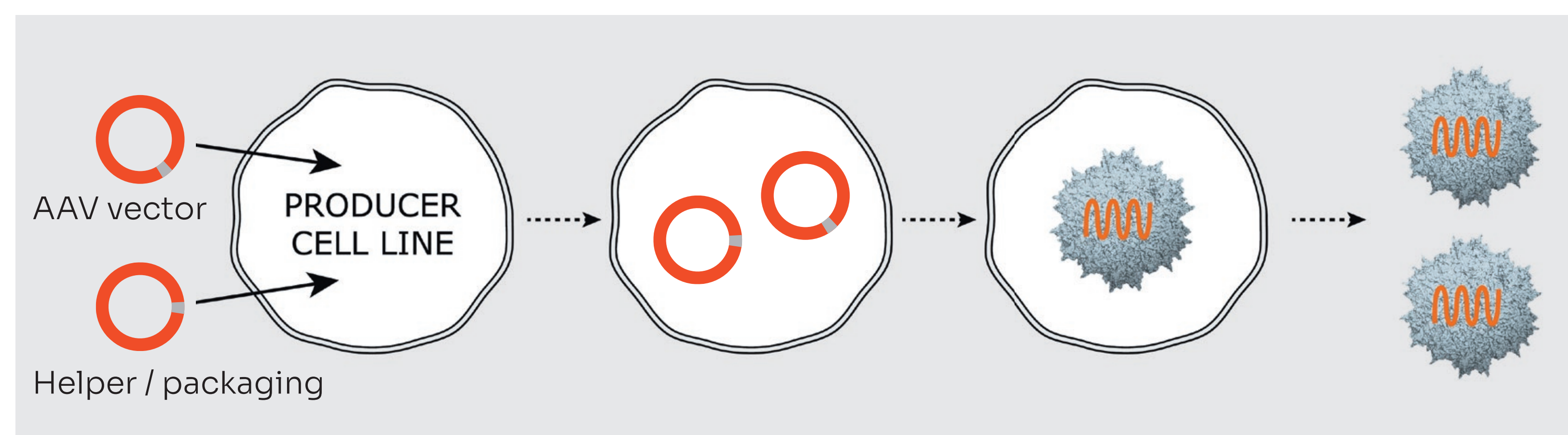


Fig. 1 – The 2-Plasmid System for AAV production.

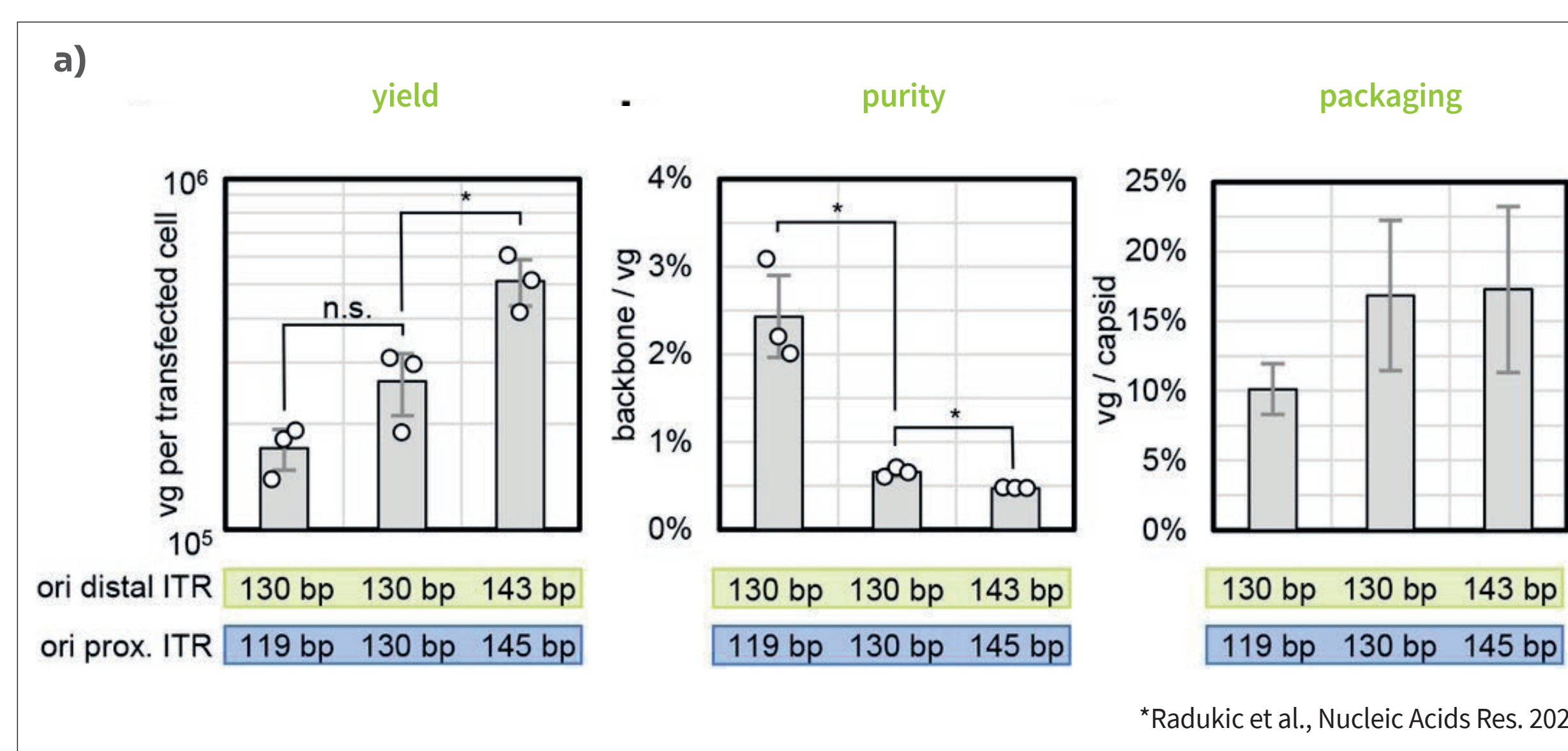
PlasmidFactory's exclusive 2-plasmid-system, licensed from DKFZ, combines helper and packaging functions on a single construct, reducing the requirement from three plasmids to two. This streamlines transfection, lowers production complexity, and enables more efficient and cost-effective AAV manufacturing at scale.

✓ **Simpler transfection** ✓ **Reduced costs** ✓ **Validated system**

Intact ITRs

Fig. 2 – ITR integrity drives vector quality.

(a) Intact AAV ITRs are essential for efficient genome rescue and replication. Plasmids with full-length ITRs generate higher titers, reduced backbone mispackaging, and more full capsids compared to truncated or deleted ITRs. (b) PlasmidFactory's ITRPROTECT & ITRRESCUE® technologies ensure stable, intact ITRs during plasmid production, thereby securing reliable yields, genomic purity, and consistent AAV performance.



✓ **Better yield** ✓ **Higher purity** ✓ **Increased packaging**

The Minicircle Advantage

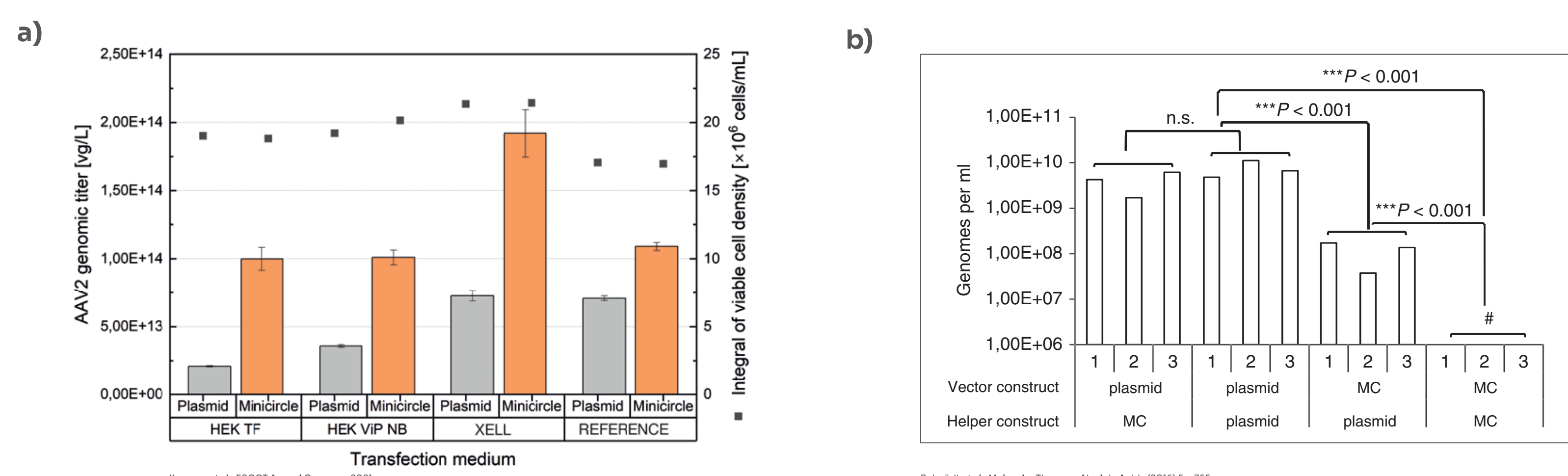


Fig. 3 – Minicircle DNA boosts AAV productivity, purity, and transduction.

(a) AAV titers measured 72 h post-transfection were 3–4× higher with minicircle DNA (MC.AAV-ssGFP + pDG, both PlasmidFactory) vs. plasmid DNA (pAAV-ssGFP + pDG, both PlasmidFactory). (b) Replacing both vector and helper plasmids with Minicircles eliminated detectable antibiotic resistance sequences from AAV preparations, resulting in bacterial backbone-free, cleaner vectors, enabling up to 30x higher transduction efficiency.

✓ **No backbone packaging** ✓ **Lower immunogenicity** ✓ **Regulatory ready**

Conclusion & Outlook

PlasmidFactory drives AAV production with DNA solutions that unite today's reliability and tomorrow's innovation.

- The **2-Plasmid System** streamlines production and reduces complexity.
- **ITRRESCUE®** protects ITRs, delivering higher yields, purity, and consistency.
- **Minicircle DNA** enables bacterial backbone-free vectors with up to 4× higher titers and 30× stronger transduction, eliminating backbone packaging and meeting future regulatory needs.

These advances enable **faster, safer, cleaner AAV manufacturing** from research to GMP. PlasmidFactory's expertise and unique portfolio make it the trusted partner for advancing gene therapies toward safer and more accessible patient treatments.



✓ **Faster, safer and cleaner AAV manufacturing**

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