# Analysis of DNA Residuals in ArthroFLEX® Dermal Allograft

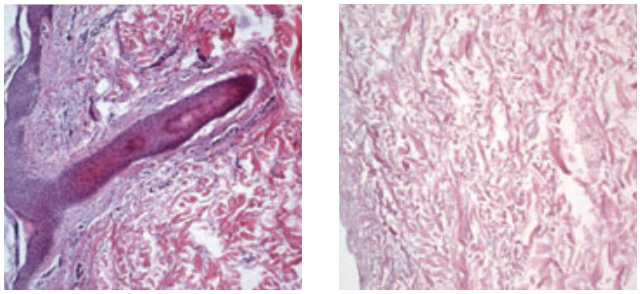
## Introduction

Decellularized skin is used for an array of procedures, including augmentation of rotator cuff, Achilles tendon, and biceps tendon repairs. In theory, decellularization results in a material devoid of immunogenic components that has improved graft incorporation, healing, and biocompatibility.[1] ArthroFlex, a novel acellular dermal matrix (ADM), goes through a validated and patented process called Matracell®, which renders the grafts acellular (Figure 1) without compromising the biomechanical or desired biological properties of the graft.[2] A key measure of the effectiveness of decellularization is removal of DNA. This quantitative DNA analysis compared ArthroFlex dermal allograft to other available ADMs.

## DNA Analysis

The DNA content of ArthroFlex dermal allograft was assessed using a highly sensitive fluorometric dye, PicoGreen™ (Invitrogen), that intercalates the DNA minor groove. The dye has a lower limit of detection of 0.7 ng DNA/mL and a lower limit of quantitation of 2.7 ng DNA/mL. The validated assay found the DNA content of tissue decellularized using the Matracell process (which results in ArthroFlex dermal allograft) is reduced by >97%,[3] to approximately 16 ng/mg dry weight.

**Figure 1.** Histological analysis of tissue prior to decellularization (left) and after treatment with the Matracell process to yield ArthroFlex dermal allograft (right). The staining methodology is hemotoxylin and eosin (H&E) to show general nuclei remnants (blue dots). Note the presence of stained cellular material prior to decellularization in contrast to the absence of nuclear staining in ArthroFlex dermal allograft.



## Comparative Results

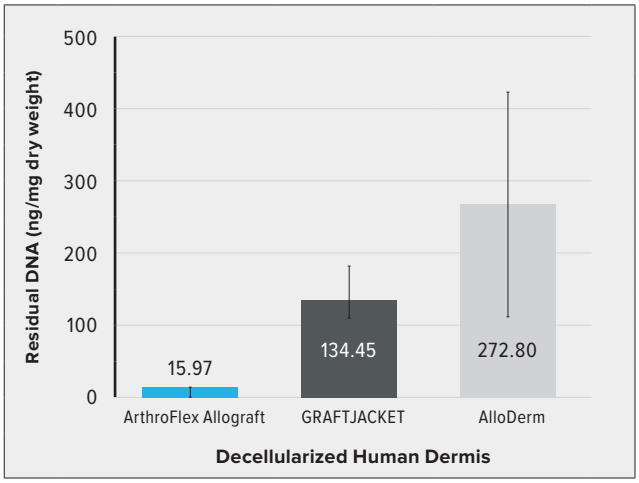
In addition, the DNA content of two other commercially available decellularized human tissues, AlloDerm™ and GRAFTJACKET™, which are both produced by the same manufacturer, was compared.

**Note: This is not a side-by-side experiment but a comparison of data available in the literature. However, all values are represented as ng/mg dry weight of tissue and the method of detection was identical.**

The publication for GRAFTJACKET states: “DNA content was determined with use of the PicoGreen dsDNA Assay (Molecular Probes) according to the manufacturer’s instructions…DNA content of GraftJacket averaged 134.6 ± 44.0 ng/mg dry weight.”[4]

The AlloDerm publication stated: “Mean DNA concentration plus or minus standard error was…272.8 +/- 168.8 [ng/mg] tissue for…cadaveric dermis”[5] (see Figure 2).

**Figure 2.** Comparison of residual DNA values for ArthroFlex dermal allograft[3] and values reported in the literature for GRAFTJACKET[4] and AlloDerm,[5] respectively.



## Conclusion

As demonstrated, the Matracell processing used to produce ArthroFlex dermal allograft effectively removes DNA and cellular content from human dermis, potentially improving graft incorporation, healing, and biocompatibility by decreasing or eliminating cellular immune responses.


**References**

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4. Derwin KA, Baker AR, Spragg RK, Leigh DR, Iannotti JP. Commercial extracellular matrix scaffolds for rotator cuff tendon repair. Biomechanical, biochemical, and cellular properties. *J Bone Joint Surg Am*. 2006;88(12):2665-72. doi:10.2106/JBJS.E.013074
5. Choe JM, Bell T. Genetic material is present in cadaveric dermis and cadaveric fascia lata. *J Urol*. 2001; 166:122-4.




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