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The morphogenetic properties of frozen-dried tissues.[1]

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Quick-freezing and drying leaves tissues in a more normal condition than other preservative methods. Such "devitalized" tissues remain relatively unmodified though their cells are dead. This fact opens a unique experimental approach to some basic problems of morphogenesis. It makes it possible to explore the interrelationship between cells and matrix by combining the devitalized matrix of one tissue with living cells of another. Likewise, valuable results may be expected from comparing those organizing effects of one cell group upon another which persist in devitalized but structurally undisrupted tissue with those of living and of disorganized dead tissue.

In preliminary tests, various tissues of frog tadpoles and Amblystoma larvae were frozen at cca. -150°C., dehydrated at -40°C., then rehydrated and transplanted to similar larvae, mostly into the dorsal fin. Such grafts become incorporated, resist resorption and substitution, preserve their original basic texture, and become invaded by host cells. Significantly, the cell population varies with the invaded tissue: in liver, the cells are small with irregular nuclei; in cartilage, they are large with large vesicular nuclei; in muscle, they are elongate; in bone cavities, reticular. The invasion cells thus imitate characteristics of the native cell population.

Devitalized cartilage of Amblystoma has induced some new cartilage formation on its surface (5 months p. op.) when transplanted to the foot, but not in the dorsal fin.

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