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Assembly of myofibrils in cardiac muscle cells.

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How do myofibrils assemble in cardiac muscle cells? When does titin first assemble into myofibrils? What is the role of titin in the formation of myofibrils in cardiac muscle cells? This chapter reviews when titin is first detected in cultured cardiomyocytes that have been freshly isolated from embryonic avian hearts. Our results support a model for myofibrillogenesis that involves three stages of assembly: premyofibrils, nascent myofibrils and mature myofibrils. Titin and muscle thick filaments were first detected associated with the nascent myofibrils. The Z-band targeting site for titin is localized in the N-terminus of titin. This region of titin binds alpha-actinin and less avidly vinculin. Thus the N-terminus of titin via its binding to alpha-actinin, and vinculin could also help mediate the costameric attachment of the Z-bands of mature myofibrils to the nearest cell surfaces.