

NINDS Contributions to Approved Therapies

NINDS invests in and conducts research across the spectrum of neuroscience and neurology research, from basic studies on fundamental biological mechanisms, to clinical trials to test new treatments in patients. Here, we describe the path leading to the development and approval of one therapy for a neurological disorder, and we highlight contributions enabled by NINDS and NIH support.

Tissue Plasminogen Activator (Alteplase, Activase®) for Acute Ischemic Stroke

Overview

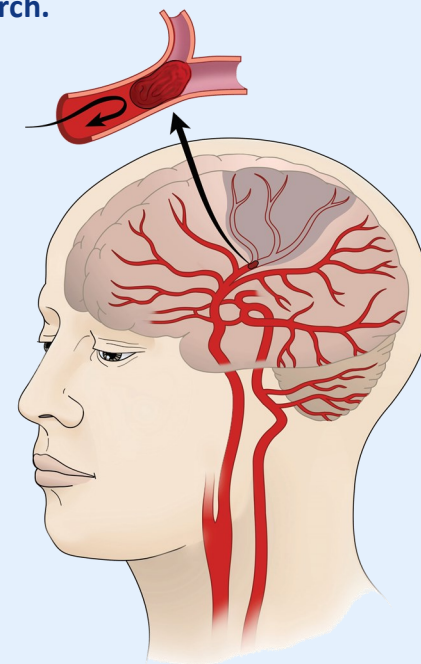
A stroke occurs when the blood supply to brain tissue is blocked by a blood clot (ischemic stroke), or when a blood vessel in the brain ruptures (hemorrhagic stroke), causing brain cells to die and resulting in functional impairments. Stroke is a leading cause of death and disability both globally and in the U.S., where approximately 800,000 people experience a stroke each year.

Although stroke remains a critical health issue, better management of cardiovascular risk factors, greater awareness of symptoms, and prompt medical attention are helping to prevent strokes and improve outcomes. Accordingly, the death rate from stroke in the U.S. fell 77% between 1969 and 2013. Another major advance was the clot-dissolving medicine tPA (tissue plasminogen activator), the

first treatment for acute ischemic stroke to receive Food and Drug Administration (FDA) approval. Known by the generic name alteplase and marketed as Activase® (Genentech), tPA works by dissolving blood clots that block blood flow to the brain. When administered quickly after stroke onset, tPA helps to restore blood flow to brain regions affected by a stroke, thereby limiting the risk of lasting damage.

NINDS played a major role in the development of tPA—from funding early studies that provided a rationale for its use, to leading pivotal clinical trials that supported the treatment's FDA approval in 1996. Most notably, NINDS scientists recognized the importance of urgent treatment for acute stroke and pioneered protocols for assessing and treating patients with

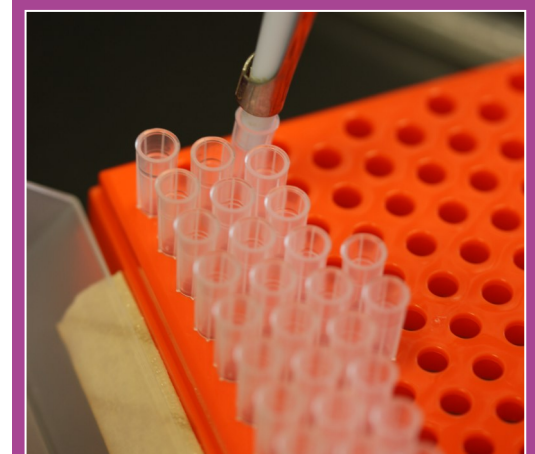
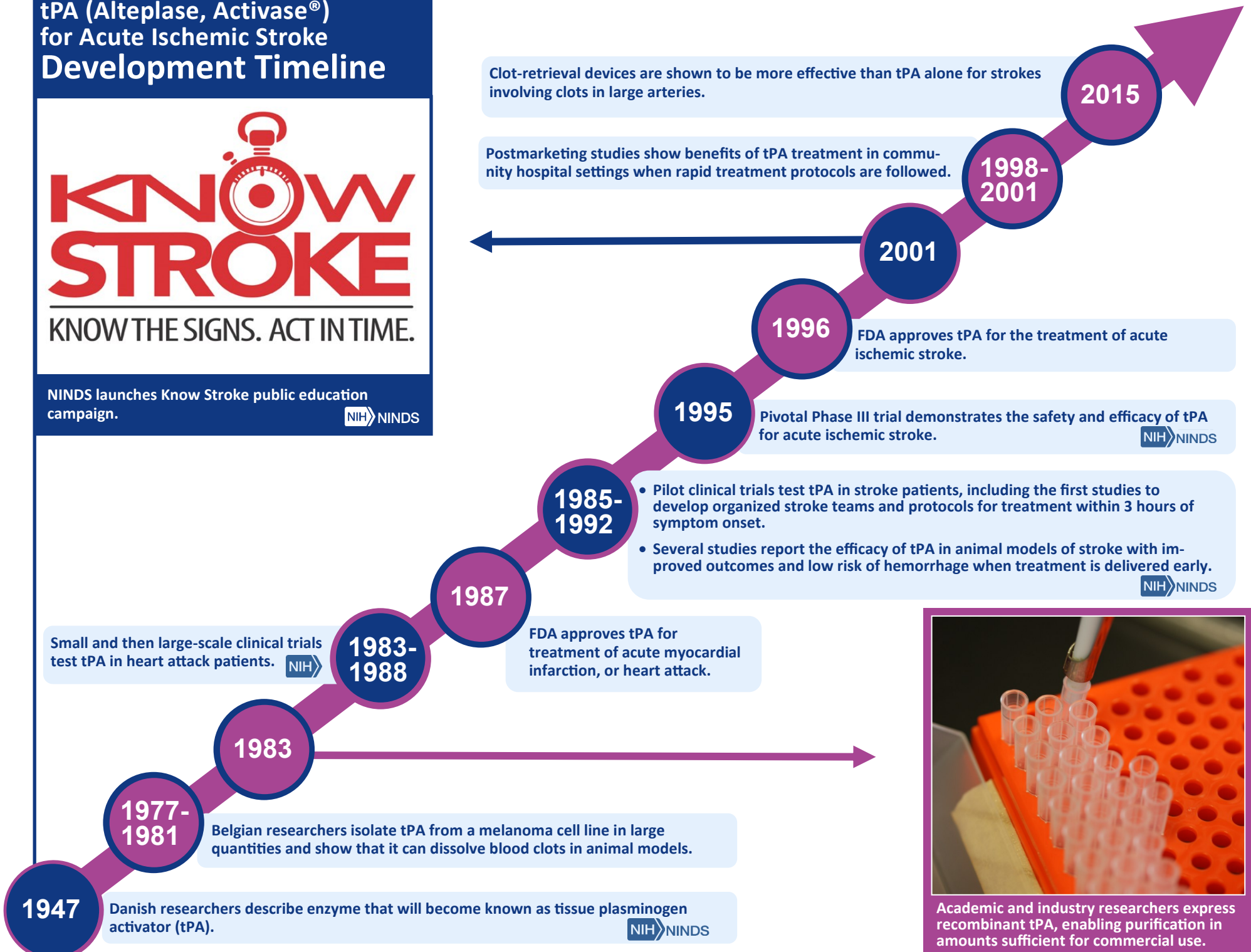
unprecedented speed. These efforts revolutionized stroke care, and the success of tPA set the stage for further progress in stroke research.



tPA (Alteplase, Activase®) for Acute Ischemic Stroke Development Timeline



NINDS launches Know Stroke public education campaign.



Academic and industry researchers express recombinant tPA, enabling purification in amounts sufficient for commercial use.