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Historical note on the therapeutic use of botulinum toxin in neurological disorders

In recent years the type A neurotoxin of *Clostridium botulinum* has been successfully used for the treatment of conditions caused by focal hypercontractions of skeletal muscles (such as strabismus, hemifacial spasm, focal dystonias, and spasticity) or smooth muscles (such as achalasia).^{1,2,3} Symptomatic therapeutic chemodenervation was pioneered by Alan B Scott.⁴ Surprisingly, the idea for therapeutic use of botulinum toxin was developed 160 years before Scott's report by the German physician and poet Justinus Kerner (1786-1862). Kerner published the earliest systematic descriptions on the clinical features of foodborne botulism in 1817 in the *Tübinger Blätter für Naturwissenschaften und Arzneykunde (Tübingen papers for natural sciences and pharmacology)*.⁵ Subsequently, Kerner published two monographs about botulism, in 1820 and 1822. His second monograph reviewed 155 cases of poisoned patients and was entitled *Das Fettgift oder die Fettsäure und ihre Wirkungen auf den thierischen Organismus, ein Beytrag zu den in verdorbenen Würsten giftig wirkenden Stoffes (The fat poison or the fatty acid and its effects on the animal organism, a contribution to the substance which acts toxically in sausages)*.⁶ Kerner considered that a toxic substance in sausages, which he called "fatty acid", was responsible for neuromuscular paralysis. One chapter was entitled *Über die Fettsäure als mögliches Heilmittel (About the fatty acid as a possible therapeutic drug)*. In this chapter he wrote (pp 337-50): "Die Fettsäure oder zoonische Säure, in solchen Gaben gereicht, daß ihre Wirkung auf die Sphäre des sympathischen Nervensystems hauptsächlich beschränkt bliebe, möchte in den vielen Krankheiten, die aus Aufreizung dieses Systems entstehen, von Nutzen seyn" ("The fatty acid or zoonic acid administered in such doses, that its action could be restricted to the sphere of the sympathetic nervous system only,

could be of benefit in the many diseases which originate from hyperexcitation of this system"). Kerner considered St Vitus's dance a possible indication for this treatment. Later in the monograph Kerner wrote: "Was aber hier über die Fettsäure als mögliches Heilmittel geäußert wurde, gehört allerdings nur in das Reich der Hypothesen, und kann nur von dereinstigen Beobachtungen bestätigt oder widerlegt werden" ("What is said here about the fatty acid as a therapeutic drug belongs to the realm of hypotheses and may be confirmed or disproved by observations in the future"). Fortunately, Kerner's early vision has been realised by the work of Alan B Scott and by subsequent and ongoing clinical research on the therapeutic use of botulinum toxin in neurological disorders.

FRANK J ERBGUTH
Department of Neurology,
University of Erlangen-Nuremberg,
Schwabachanlage 6,
D-91054 Erlangen, Germany

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