

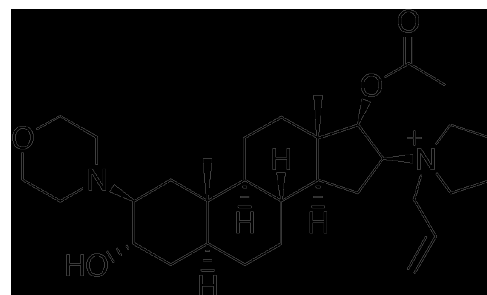
NEW "OLD" DRUG: Rocuronium (Zemuron®)

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Rocuronium, a non-depolarizing neuromuscular blocking agent, was released to the market in the United States in 1994 and marketed under the trade name Zemuron®. It is manufactured by Baxter Pharmaceutical Solutions, LLC (Bloomington, IN, USA) and Organon Ltd. (Dublin, Ireland) and distributed by Schering Corporation. It is indicated as an adjunct to general anesthesia to aid both rapid sequence and routine tracheal intubation, and to provide skeletal muscle relaxation during surgery or mechanical ventilation^{1,2}. Due to its use in routine medical procedures, in which death could follow, as well as its possible role in suicides and murder cases, the drug was added to our comprehensive panel of drugs in 2008. In routine casework over the past 2 years, rocuronium has been detected in 68 cases and postmortem whole blood concentrations ranged from 25 ng/mL – 24,633 ng/mL. Analytical reference standards can be purchased from Sigma-Aldrich (R5155) and Toronto Research Chemicals, Inc. (R639500). Its primary metabolite, 17-desacetylrocuronium is available from Toronto Research Chemicals, Inc. (D288705). Rocuronium is chemically related to Pancuronium (Pavulon®) and Vecuronium (Norcuron®).

General Information

IUPAC Name:	1-[17β-(acetyloxy)-3α-hydroxy-2β-(4-morpholinyl)-5α-androstan-16β-yl]-1-(2-propenyl)pyrrolidinium bromide
Common Name:	Rocuronium, Rocuronium bromide, Org-9426
Trade Name:	Zemuron® (United States), Esmeron® (outside of United States)
Appearance:	White to off-white colored powder; clear to yellow/orange liquid
Chemical Formula:	C ₃₂ H ₅₃ N ₂ O ₄ ⁺ (base), C ₃₂ H ₅₃ BrN ₂ O ₄ (base + salt)
Molecular Weight:	529.77 (base), 609.68 (base + salt)
CAS Number:	119302-91-9
Rx Dosage:	Tracheal Intubation – initial dose of 0.6 mg/kg Rapid Sequence Intubation – 0.6 to 1.2 mg/kg Continuous Infusion – initial rate of 10 to 12 mcg/kg/minute ³
Recreational Dosage:	N/A
Availability:	Hospitals, Medical Facilities, Emergency Rooms 5 mL vial with 50 mg of active ingredient (10 mg/mL) 10 mL vial with 100 mg of active ingredient (10 mg/mL)



Pharmacology

Half-Life:	1.0 – 1.8 hours ⁴
Elimination:	Eliminated in the urine as unchanged drug and 17-desacetylrocuronium
Mechanism of Action:	Competes for cholinergic receptors at the motor-end plate in the neuromuscular junction

Analytical Toxicology

Screening Analysis:	LC-ToF following a protein precipitation extraction with acetonitrile; Limit of detection (LOD) is 10 ng/mL Theoretical accurate [M+H] ⁺ is 529.4005. Theoretical accurate [M+2H] ²⁺ is 265.2042.
Confirmatory Analysis:	LC/MS/MS following a liquid-liquid extraction with methylene chloride Linearity 25 ng/mL – 10,000 ng/mL; Quadratic curve fit; Laudanosine as an internal standard Quantitative MRM is 529.389 ⇒70.06 Qualitative MRM is 529.389 ⇒12.14

References

1. Hunter JM. "Rocuronium: the newest aminosteroid neuromuscular blocking drug". *British Journal of Anaesthesia* 76 (4): 481–3.

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- Magorian, T et. al. “Comparison of rocuronium, succinylcholine, and vecuronium for rapid-sequence induction of anesthesia in adult patients”. *Anesthesiology* 79:913-918, 1993.
- Zemuron® prescribing information. <http://www.spfiles.com/pizemuron.pdf>.
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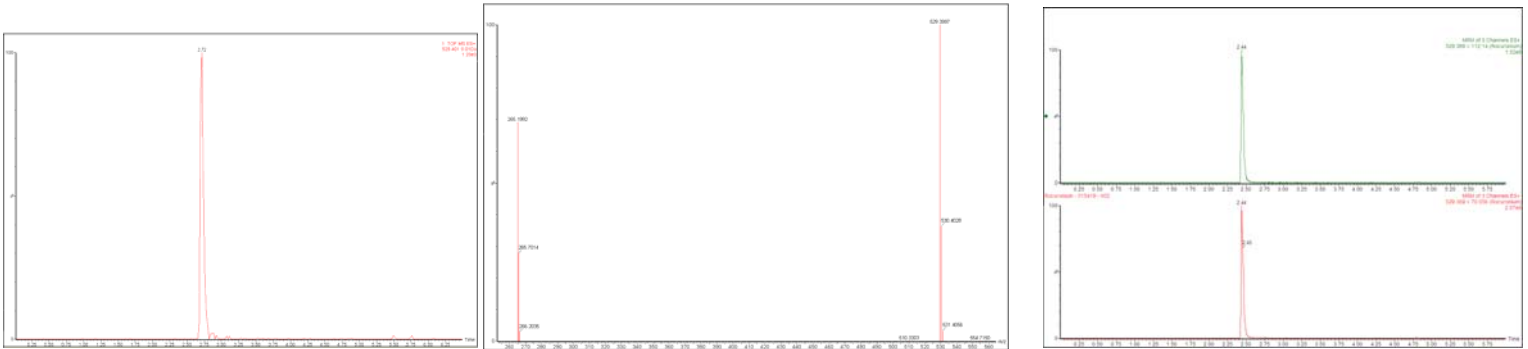


Figure 1 - LC-ToF Extracted Ion Chromatogram (XIC) of Rocuronium in Postmortem Whole Blood Specimen

Figure 2 - LC-ToF Extracted Ion Spectrum (XIS) of Rocuronium in Postmortem Whole Blood

Figure 3 - Confirmatory Analysis of Rocuronium by LC/MS/MS – Postmortem Whole Blood Specimen (750 ng/mL)