Pseudocholinesterase

Description	Pseudocholinesterase, also known as Butyrylcholinesterase or plasma/serum cholinesterase, is a tetrameric glycoprotein enzyme that hydrolyses both endogenous and exogenous choline esters. (Acetylcholinesterase is a related enzyme of red blood cells with specificity for acetylcholine.) Enzyme activity and inhibition studies are provided.
Indication	• Patients who develop scoline apnoea post-surgery • Pre-operative screening of patient or close family member of patient with butyrylcholinesterase deficiency or history of prolonged paralysis requiring several hours of ventilation support after an operation involving suxamethonium. • Acute organophosphate poisoning or chronic occupational exposure to organophosphates, e.g. pesticide workers or organic chemical industry workers.
Additional Info	<u>Butyrylcholinesterase deficiency:</u> • Causes suxamethonium/scoline apnoea, temporary postsurgical paralysis in patients treated with suxamethonium, a depolarising neuromuscular blocking agent used as a muscle relaxant. • Inherited deficiency is caused by a liver enzyme abnormality. • Acquired deficiency occurs in pregnancy, liver disease, renal disease, hypothyroidism and drug therapy (e.g. methotrexate or monoamine oxidase inhibitors). <u>Organophosphate poisoning</u> • Organophosphates inhibit both butyrylcholinesterase and acetylcholinesterase, hence measurement can be useful to confirm/monitor toxicity. • Symptoms include headache, blurred vision, excessive salivation, sweating, wheezing, bradycardia, convulsions, respiratory muscle paralysis and coma. • Primary treatment is supportive. • Antidote therapy may be given: atropine blocks the muscarinic effects, pralidoxime mesylate reactivates phosphorylated cholinesterase.
Concurrent Tests	• Acetylcholinesterase (preferred to butyrylcholinesterase in acute organophosphate toxicity) • Butyrylcholinesterase genotype (if phenotype difficult to confirm or atypical phenotype in the immediate family)

Dietary Requirements	N/A
Interpretation	Note: Enzyme activity can be lowered in chronic liver disease, pregnancy, renal disease, shock, malnutrition and some cancers. Increased activity can occur in hyperlipidaemia. <u>Butyrylcholinesterase deficiency:</u> Degree of sensitivity to suxamethonium varies with phenotype: • UU: no risk • UA / UF: small risk of increased recovery time of around 30 minutes if suxamethonium used during pregnancy • FF / FS / AF: intermediate sensitivity to suxamethonium • AA / AS: prolonged paralysis = 2 hours • SS: prolonged paralysis > 3 hours <u>Organophosphate poisoning</u> • < 50 % of normal: confirms organophosphate exposure • < 20 % of normal: associated with severe symptoms
Collection Conditions	• Samples collected during suxamethonium-induced apnoea are unsuitable as the presence of the drug leads to erroneously low activity. • Successful management of apnoea does not require measurement of butyrylcholinesterase, therefore wait until patient has recovered. • Allow 6 weeks if patient treated with fresh frozen plasma or a cholinesterase preparation.
Frequency of testing	Repeat analysis is not indicated unless performing regular monitoring for potential toxicity in occupational exposure to organophosphates.