

Department:	Biochemistry		
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## Short Synacthen Test

Adrenal glucocorticoid secretion is controlled by adrenocorticotrophic hormone (ACTH) released by the anterior pituitary. This test evaluates the ability of the adrenal cortex to produce cortisol after stimulation by synthetic ACTH (tetracosactide; Synacthen®). It does not test the whole pituitary-adrenal axis.

### Indications

1. Used in the diagnosis of hypoadrenalism as a screening test.
2. It is an increasingly used alternative to the insulin tolerance test to diagnose secondary hypoadrenalism due to pituitary hypofunction. However, it should not be used in the early post-operative assessment of the hypothalamic-pituitary-adrenal axis as response may be normal (an insulin tolerance/glucagon stress test should be used instead).
3. May also be used to ascertain that the adrenals are functioning normally after a prolonged course of corticosteroids, or after suppression by Cushing's syndrome (e.g. after removal of a unilateral Cushing's adrenal adenoma).

### Contraindications

Test not required for assessment of hypoadrenalism if random cortisol >430 nmol/L.  
The Short Synacthen test gives unreliable results within 2 weeks of pituitary surgery.

### Preparations and precautions

- Glucocorticoid replacement on the day of the test invalidates the test.
- Prednisolone should be stopped 24 hours before the Short Synacthen test.
- Hydrocortisone should be omitted on the morning of the Short Synacthen test.
- For non-urgent cases, combined OCP and HRT should be stopped for 6 weeks prior to the test. Pregnancy will also affect results due to the increase in CBG.

### Side Effects

- There are rare reports of hypersensitivity reactions to Synacthen particularly in patients with history of allergic disorders. Adrenal haemorrhage has also been reported rarely.

### Requirements

- 250 µg Synacthen (1 ampoule)
- 2x brown top serum tubes
- 1 x pink EDTA tube

### Procedure

- This test should be performed preferably in the morning between 0800 and 0900 hours but can be performed later in the day.

Minutes	Procedure	Sample
0	Take 3ml blood for Cortisol and 3ml for ACTH then administer 250µg Synacthen IM / IV	1 x brown top serum (cortisol) 1 x pink EDTA (ACTH)
30	Take 3ml blood for Cortisol	1 x brown top serum (cortisol)

N.B A 60 minute sample may be taken when assessing adrenal reserve post steroid therapy

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For patients on prednisolone, particularly respiratory patients, cortisol should be measured by mass spectrometry due to interference in immunoassay. This can be requested in EPIC once patient is identified as being on prednisolone.

### Interpretation of results

Adrenal insufficiency is excluded by a 30 min value  $>430$  nmol/L.

If impaired cortisol response, and ACTH  $>200$  ng/L the diagnosis is primary adrenal failure.

If ACTH  $<10$ ng/L then diagnosis is secondary adrenal failure.

Serum cortisol  $>650$  nmol/L excludes deficiency in patients on oestrogens. [Reference El-Farahan Clin Endo (2013) **78** 673-80.

For patients on glucocorticoid replacement interpretation of the response is not straightforward and depends on the duration, and dose of glucocorticoid treatment received.

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