

Biogenic Amines

BMF 85 - Biogenic Amines

A biogenic amine is a naturally produced substance containing one or more amine group. There are five established biogenic amine neurotransmitters: the three catecholamines - dopamine, norepinephrine (noradrenaline), and epinephrine (adrenaline) plus histamine and serotonin. Catecholamines are released into the bloodstream in response to physical or emotional stress. These are known as the 'flight or fight' hormones and are responsible in part for that 'rush' people feel when they are afraid. Catecholamines are produced by chromaffin cells in the medulla of the adrenal gland.

Phaeochromocytoma (PCC)

Catecholamines are of clinical interest because they are diagnostic of phaeochromocytoma (PCC), a tumour of the chromaffin cells. Approximately 15% of tumours occur outside the adrenal glands (typically in the abdomen) and are called paragangliomas. Tumours may grow very large, but most are less than 10 cm. Approximately 10% are cancerous.

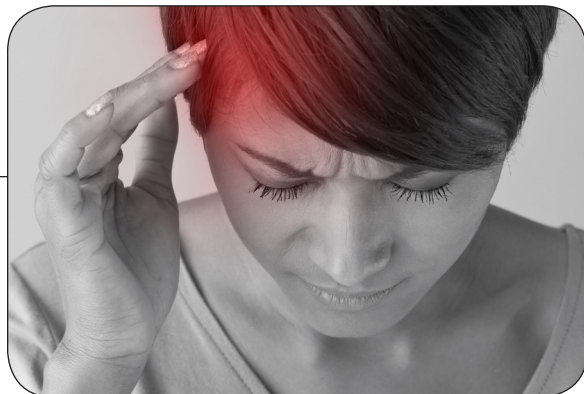
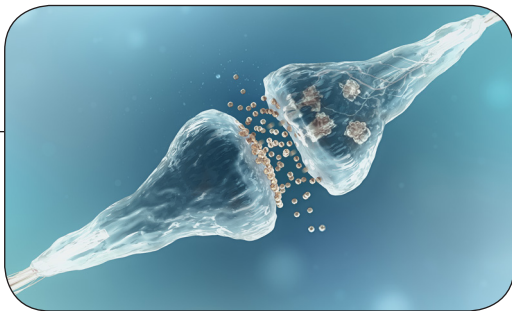
PCC is more common in women than in men. It occurs in early to mid-adulthood. 10% occur in children. PCC can be hereditary (Multiple Endocrine Neoplasia (MEN), Von Hippel-Lindau Syndrome, Neurofibromatosis) but may also develop sporadically.

The signs and symptoms are a consequence of over activity of the sympathetic nervous system:

Signs and symptoms of PCC

- Headaches
- Sweating
- Fast heart beat
- High blood pressure
- Anxiety or panic attacks
- Nausea
- Tremors
- Weakness
- Abdominal pain
- Weight loss
- Elevated blood glucose
- Sudden death

Not all patients experience all of these signs and symptoms. The most common presentation is headache, sweating and increased heart rate. Symptoms occur in discrete attacks at unpredictable intervals, and usually last 15 to 20 minutes. A doctor is more likely to consider PCC if the patient is young and has no other risk factors or habits that may cause these findings. Some people never develop symptoms. Up to 10% of cases are discovered incidentally.



BMF 85 - Biogenic Amines

Diagnosis

- Familial history > Genetic testing
- 24 Hour urine test
- Plasma catecholamines
- Imaging
- Biopsy

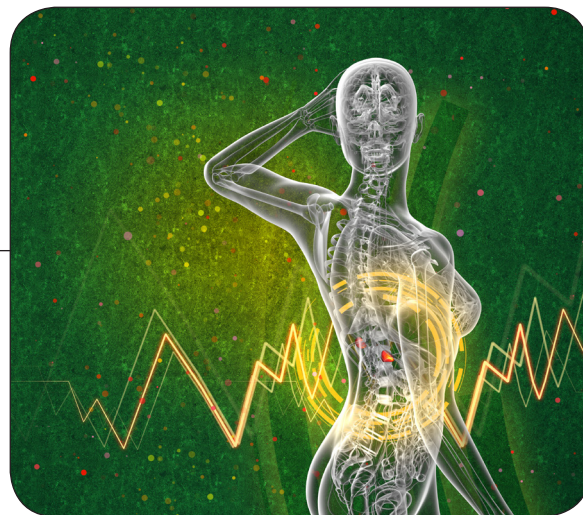
If a tumour is intermittently secreting catecholamines plasma tests may fail to detect any abnormality, whereas urine measurements are more likely to be elevated. Urine and plasma metanephrines (catecholamine metabolites) may be preferred as they are usually present in greater quantities than catecholamines in the urine, and can persist in the blood even when catecholamine levels have returned to normal.

Treatment

Surgery is the definitive treatment for PCC. Where tumours are confined to the adrenal gland and are benign there is a good prognosis. Recurrence rates average around 10%. Patients with recurrent tumours, tumours that spread or unable to be removed surgically, have a fair to poor outlook. Other treatments include alpha blockers to control blood pressure, tyrosine kinase inhibitors to inhibit the formation of hormones by the tumour or chemo therapy / radio therapy for malignant tumours.

Other applications

Biogenic amines may also be used for diagnosis of neuroblastoma, the most common cancer in infancy, or carcinoid tumour, a slow-growing type of neuroendocrine tumour.





BMF 85 - Biogenic Amines

Chiron now offer standards and standard mixes for catecholamines:

Catalogue No.	Description	Cas No.	Concentration	Solvent	Volume
11651.8-K-ME	Dopamine	51-61-6	1000 µg/mL	methanol with 5% 1M HCl	1 mL
11648.9-K-ME	(±)-Epinephrine hydrochloride	329-63-5	1000 µg base/mL	methanol	1 mL
11653.10-K-ME	5-Hydroxyindole-3-acetic acid (5-HIAA)	54-16-0	1000 µg/mL	methanol	1 mL
10983.10-10MG	5-Hydroxyindole-3-acetic-2,2- <i>d</i> 2 acid (5-HIAA- <i>d</i> 2)	56209-31-5	neat	neat	10 mg
11646.10-K-ME	(±)-Metanephrine hydrochloride	881-95-8	1000 µg base/mL	methanol	1 mL
12006.10-100-ME	(±)-Metanephrine- α,β,β - <i>d</i> 3 hydrochloride	1085333-94-3	100 µg base/mL	methanol	1 mL
12007.20-100-ME	(±)-Metanephrine- <i>d</i> 3 hydrochloride (N-methyl- <i>d</i> 3)	1215507-88-2	100 µg base/mL	methanol	1 mL
11650.9-K-ME	3-Methoxytyramine hydrochloride (3-MT HCl)	1477-68-5	1000 µg base/mL	methanol	1 mL
12008.9-100-ME	3-Methoxytyramine- <i>d</i> 4 hydrochloride	1216788-76-9	100 µg base/mL	methanol	1 mL
12008.9-10MG	3-Methoxytyramine- <i>d</i> 4 hydrochloride	1216788-76-9	neat	neat	10 mg
10518.10-1G	Methyldopa sesquihydrate (α -Methyl-L-DOPA)	555-30-6	neat	neat	1 g
11649.8-K-ME	(±)-Norepinephrine hydrochloride	55-27-6	1000 µg base/mL	methanol	1 mL
11647.9-K-ME	(±)-Normetanephrine hydrochloride	1011-74-1	1000 µg base/mL	methanol	1 mL
12009.8-100-ME	(±)-Normetanephrine- α,β,β - <i>d</i> 3 hydrochloride	1085333-97-6	100 µg base/mL	methanol	1 mL
12012.10-25MG	Serotonin hydrochloride (5-Hydroxytryptamine, 5-HT)	153-98-0	neat	neat	25 mg
10864.10-100-ME	Serotonin- <i>13C</i> 2, <i>15N</i> hydrochloride (ethylamine- <i>13C</i> 2, <i>15N</i>)	153-98-0 (unlabelled)	100 µg base/mL	methanol	1 mL
10864.10-5MG	Serotonin- <i>13C</i> 2, <i>15N</i> hydrochloride (ethylamine- <i>13C</i> 2, <i>15N</i>)	153-98-0 (unlabelled)	neat	neat	5 mg
12010.9-100MG	(±)-Vanillomandelic acid (VMA, HMMA)	2394-20-9	neat	neat	100 mg
10982.9-100-ME	(±)-Vanillomandelic acid- <i>d</i> 3 (VMA- <i>d</i> 3, HMMA- <i>d</i> 3)	74495-70-8	100 µg/mL	methanol	1 mL
10982.9-50MG	(±)-Vanillomandelic acid- <i>d</i> 3 (VMA- <i>d</i> 3, HMMA- <i>d</i> 3)	74495-70-8	neat	neat	50 mg



BMF 85 - Biogenic Amines

Catalogue No.	Description	Cas No.
Component part	Catecholamine Mix 1 3 Compounds at 1000 µg base/mL in methanol	
11646.1	(±)-Metanephrine hydrochloride	[881-95-8]
11647.9	(±)-Normetanephrine hydrochloride	[1011-74-1]
11650.9	3-Methoxytyramine hydrochloride	[1477-68-5]
S-4904-K-ME	1 x 1 mL ampoule	
S-4904-K-MEx5	5 x 1 mL ampoules	

Catalogue No.	Description	Cas No.
Component part	Catecholamine Mix 2 6 Compounds at 1000 µg base/mL in methanol	
11646.1	(±)-Metanephrine hydrochloride	[881-95-8]
11647.9	(±)-Normetanephrine hydrochloride	[1011-74-1]
11648.9	(±)-Epinephrine hydrochloride	[329-63-5]
11649.8	(±)-Norepinephrine hydrochloride	[55-27-6]
11650.9	3-Methoxytyramine hydrochloride	[1477-68-5]
11651.8	Dopamine	[51-61-6]
S-4905-K-ME	1 x 1 mL ampoule	
S-4905-K-MEx5	5 x 1 mL ampoules	

*For ordering and information about prices and delivery in your country, please contact your **local distributor**:*