

Screening of opiates in hair using a homogeneous immunoassay procedure

A. Agrawal, M. Vincent, G. Wang, M. Nguyen, C. Castro, C.R. Henry, C. Moore

Immunoanalysis Corporation, 829 Towne Center Drive, Pomona, CA 91767



Introduction

Hair is a useful specimen for the detection of long-term drug use. In general, drug concentrations in hair are lower than those identified in other matrices (e.g. urine, blood). Specimen volume may be limited, so sensitive screening methods are necessary. Following heroin use, the metabolites detected in hair are 6-AM, morphine and possibly codeine, so a screening immunoassay should be targeted to these analytes.

Methods

- Hair from opiates users (n = 19; 10mg); drug free hair (n = 20; 10mg)
- Cut into small pieces; 0.025 M phosphate buffer added (pH 2.7; 0.5 mL); Incubated (3hrs/75°C)
- Supernatant was analyzed using ELISA; and via homogeneous immunoassays (HEIA) on an Olympus 400 platform
- For ELISA, supernatant was diluted 1:5 with 0.1 M PBS before plating; For HEIA, 20µL of supernatant was used

Cross-reactivity

Drug	XR (%)
Morphine	100
6-Acetyl Morphine	120
Codeine	125
Diacetylmorphine	50
Dihydrocodeine	50
Hydrocodone	20
Hydromorphone	6
Oxycodone	3
Normorphine	0.4
Morphine-3- Gluc.	3

Results

A screening cutoff of 200 pg/mg of MOR was used, (recommendation Proposed Federal Guidelines 2004)

Precision at 100, 200, 400, 2000 and 5000 pg/mg: 10.7%, 7%, 8.6%, 5.8% and 10.1%

All negative specimens screened negatively using both ELISA and EIA; results of positive specimens shown

Sample	ELISA	HEIA	GC/MS results (pg/mg)		
	200 pg/mg MOR	200 pg/mg MOR	Morphine	Codeine	6-AM
1	P	P	1091	608	4366
2	P	P	203	190	714
3	P	P	640	393	2904
4	P	P	294	176	822
5	P	P	788	314	3987
6	P	P	423	428	808
7	P	P	866	448	5831
8	P	P	551	563	2032
9	P	P	473	312	1672
10	P	P	734	453	1430
11	P	P	758	479	4792
12	P	P	900	637	1436
13	N	N	ND	ND	ND
14	P	P	336	406	1932
15	N	N	ND	ND	ND
16	P	P	495	284	1136
17	P	P	363	212	868
18	P	P	408	193	766
19	N	P	799	461	1677

Summary

- The assay is precise, sensitive and conducive to rapid hair screening using commercial chemistry analyzers

Disclosure: Immunoanalysis Corporation manufactures and distributes the immunoassays described in this presentation