JOURNAL-BASED LEARNING EXERCISES

IBMS CPD

Each article's contents should be read, researched and understood, and you should then come to a decision on each question. The pass mark is 17 out of 20 questions answered correctly. JBL exercises may be completed at any time until the published deadline date. Please select your choice of correct answers and complete the exercises online at: **www.ibms.org/cpd/jbl**

DEADLINE WEDNESDAY 5 DECEMBER 2018

Iron deficiency without anaemia is a potential cause of fatigue: meta-analyses of randomised controlled trials and cross-sectional studies. Yokoi K, Konomi A. *Br J Nutr* 2017; **117** (10): 1422–31 (www.cambridge.org/core/journals/british-journal-of-nutrition/article/iron-deficiency-without-anaemia-is-a-potential-cause-of-fatigue-metaanalyses-of-randomised-controlled-trials-and-crosssectional-studies/F7E59D4BFC154E9687E42CDCC4968EAF). Assessment No 090418

Relative resistance index (RRI) – a scoring system for antibiotic resistance in *Pseudomonas aeruginosa* Ewing J, McCaughan J, Moore J *et al. Br J Biomed Sci* 2017; **74** (4): 198–202. Assessment No 090118

	Iron deficiency		RRI
01	There is no established diagnostic method for iron deficiency without anaemia (IDNA) in patients with inflammatory diseases.	01	The most commonly isolated pathogen from cystic fibrosis (CF) airways according to the authors is MRSA.
02	Mast *et al.* found that 30 ng/mL of serum ferritin (sFer) gave higher sensitivity for iron deficiency compared with 12 ng/mL.	02	Mucoid *Pseudomonas aeruginosa* (PA) colonies can form a matrix where microcolonies can exist; these are thought to provide protection against antibiotic therapy but not the host immune response.
03	Fatigue not associated with known causes is a very common complaint in the general population.	03	To determine the potential clinical relevance of the RRI, BMI was considered as a clinical variable.
04	All subjects in the Goldenberg 2013 cross-sectional study were female.	04	Within the study those patients colonised with both PA and *Burkholderia cepacia* were included in the study.
05	A significant covariate in the Lasocki 2014 cross-sectional study was Hb <10 g/dL.	05	Mucoid PA phenotypes are protected from the selective pressure of antibiotics.
06	In the Japanese cross-sectional study included in the analysis that targeted young women aged about 20, IDNA and non-ID groups were well matched.	06	The findings suggest that it is likely that individuals with lower FEV_1 % predicted probably develop more resistant forms of PA.
07	The Comin-Colet 2013 cross-sectional study showed that subjects in the IDNA group complain less of fatigue than those in the non-ID group.	07	The results showed a moderate positive correlation of RRIs with number of IV days for mucoid strains.
08	All cross-sectional studies on the relationship between IDNA and fatigue have found an association between them.	08	Initial colonisation in patients is generally with non-mucoid strains of PA, with mucoid strains predominating at a later stage.
09	In some of the studies, some participants with IDNA according to the authors' own definitions of iron deficiency would be considered as having normal iron status according to the accepted IDNA definition.	09	The authors suggest their proposed RRI is a means of combining single antimicrobial susceptibilities into a single index that can easily be interpreted by clinicians.
10	Iron deficiency is more prevalent in Japan than in other developed countries.	10	RRI was not shown to be significantly correlated with duration of colonisation with chronic PA or BMI.
11	All RCTs in the study had identical inclusion criteria for Hb level.	11	PA showing multiple antibiotic resistance has been associated with a higher FEV_1 % predicted.
12	It is not possible from the study to know the threshold effective in finding fatigue patients who benefit from iron treatment because the study accepted various authors' sFer thresholds to define IDNA.	12	The authors propose that poor lung function is caused by increasing RRIs.
13	There was >15 g/L difference between the mean Hb level for IDNA in the Beck 2012 and Lasocki 2014 cross-sectional studies.	13	The expectation of the study was that RRIs would be higher for non-mucoid PA.
14	One possible mechanism for how IDNA causes fatigue is increased VO_2 by tissues, creating cardiopulmonary stress.	14	Ceftazidime resistance had the strongest positive correlation with number of IV antibiotic days, followed by meropenem.
15	All six RCTs in the study were double-blind, placebo controlled and exclusively focused on younger adult women.	15	As part of the statistical analysis used, the differences between median RRIs between 2010 and 2011 were assessed using the Mann-Whitney test.
16	Iron treatment was effective to reduce fatigue in the Verdon 2003 RCT.	16	Overall scores for mucoid PA did not correlate with FEV_1 % predicted.
17	The study by Greminger and Mayer-Pröschel showed that rats exposed to a marginal Fe diet through gestation and weaning exhibited abnormal auditory brainstem responses.	17	In the study, 85 patients met the inclusion criteria.
18	The Sawada 2014 cross-sectional study adopted the same definition of iron deficiency as the Vaucher 2012 RCT study.	18	Resistance to meropenem had the strongest negative correlation with FEV_1 % predicted, followed by aztreonam.
19	For cross-sectional studies, the influence of unobserved/unobservable confounders was removed because effect sizes were corrected for confounders by multivariate analysis.	19	During the trial those cultures of PA that were deemed resistant were given a score of 1.
20	The RCTs of Beutler 1960 and Vaucher 2012 had no inclusion criteria.	20	The results showed that there was a strong positive correlation of RRIs with age for non-mucoid strains.

REFLECTIVE LEARNING

01	Discuss the evidence for an association between fatigue and IDNA.	01	The study carried out was in response to the need for accurate resistance data to inform CF patient management. With reference to your local data, what problems do you encounter using traditional or non-traditional susceptibility testing for mucoid PA phenotypes?
02	Discuss the evidence for a therapeutic effect of Fe on fatigue in IDNA.	02	How could your laboratory adapt the approach taken in this study to better inform clinicians?