ACB News

The Association for Clinical Biochemistry & Laboratory Medicine | Issue 671 | June 2021

UKMedLab21

Online • 14-18 June

Join us for the ACB's first online national meeting

Full programme included within this issue

www.acb.org.uk/ukmedlab21

Find out more at www.calprotectin.co.uk

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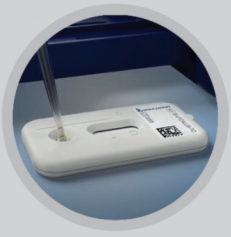

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ACB News

The bi-monthly magazine for clinical science

Issue 671 • June 2021

The Association for Clinical Biochemistry & Laboratory Medicine

Better Science, Better Testing, Better Care

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President's Message – June 2021

As I prepare to hand over the ACB Presidency this month I have much to reflect on. None of us could have predicted the events of the past year or so which have dominated the majority of my tenure as President.

I have never been more proud of our profession. We have been, and still are, at the centre of a global public health emergency and we have stepped up to the mark and we have excelled. All this in the face of rising infection rates, overcrowded health facilities and staff sickness.

But, we have worked through it and whilst we were all busy with the day jobs it was essential that the ACB continued to function to keep our community together to support each other and to keep everyone up to date in a fast moving situation. So, thanks to all our Members for responding so well and engaging in what became a virtual ACB in 2020 – Zoom and Teams meetings, online articles from the *Annals*, a digital *ACB News*, regular e-newsletters with COVID-19 updates, and reaching out to our Retired Members.

Unfortunately, we couldn't find a way to stage Focus in 2020 and my thanks go out to the Local Organising Committee who had done so much work leading up to it. Out of that work though, a phoenix has risen from the flames in the form of a rebranded, integrated national meeting – **UKMedLab21** – which sets us on a great

path for the future. Please find out more on **pages 6-11.**

Bernie Croal will be taking over as ACB President very shortly and I wish him all the best for his tenure. Whilst the past year has been challenging, it has enabled us to build news ways of working that will stand us in good stead for the future. I look forward to seeing where Bernie takes the ACB next.

And my last words must be to thank you. I cannot overestimate how important your contribution has been this year. I welcome a new era of public awareness and appreciation of the importance and impact of our profession on the nation's health. ■

Message from the CEO

Welcome to the June issue of *ACB News.* Not surprisingly, the ACB team is very focussed on **UKMedLab21** for the next couple of weeks. Delegate bookings are coming in thick and fast and we are looking forward to a bumper week of content. The online nature of the event means we can spread the event over a longer period and avoid parallell sessions so you can attend all that's on offer if you wish. If you are able to participate in all the workshops and seminars you'll be able to collect up to 26 CPD points. I am sure that's welcome after the cancellation of so much training last year.

In the background, we are continuing our upgrades of digital services and IT systems. Thank you for your patience whilst we roll out so many new systems in quick succession. It's not an ideal scenario to change everything at once but whilst you were all so busy last year we thought it was the right time to make the changes.

We hope too to make a start on developing *ACB News* in line with your recent feedback. We had a great kick-off

meeting this week with the editorial, design and publishing team so watch this space.

I hope some sort of normality is returning for you both at work and at home. I am certainly looking forward to reopening the ACB office in Tooley Street and welcoming the team back from 1st July. ■

ACB National Meeting 2021

UKMedLab21
Online • 14-18 June

Welcome to UKMedLab21, the ACB's first online National Meeting.

Incorporating the meetings that were formerly Frontiers in Laboratory Medicine (FiLM) and Focus, the week long programme is packed with educational, scientific and leadership and policy content.

You will have the opportunity to view the online poster gallery and Expo, interact with speakers and delegates and take part in a fun quiz hosted by our ACB quizmaster, Kevin Deans.

The online nature of the meeting means that we have extended the duration and don't need to run parallel sessions. So, you can attend all the sessions and accumulate up to 26 CPD points.

If you can't fit it all into one week the content will still be available to delegates to view up to a month after the event at a time that suits you –– so there's no reason to miss anything.

Detailed below is a programme overview so you can see the whole week at a glance and the full programme is outlined on the following pages.

Don't delay, **book your place now**. We look forward to seeing you there.

	Monday 14 June	Tuesday 15 June	Wednesday 16 June	Thursday 17 June	Friday 18 June
AM	ACB Training Day	Welcome Leadership & Management Session 1	Leadership & Management Session 2	Leadership & Management Session 3	Science & Education Session 4
	Lunchbreak				
PM	Scholarship Update	Industry Workshops			
	ACB Training Day	Science & Education Session 1	Science & Education Session 2	Science & Education Session 3	Medal Awards Annual General Meeting Closing Ceremony & Winners Announcement
				Social Quiz	

- ACB Training Day
- Leadership & Management
- Science & Education
- Annual General Meeting (Members Only)
- Open Access and Social

For a breakdown of timings please see the full programme

UKMedLab21 Programme

Monday 14th June – Training Day

Survivor's guide to inborn errors of metabolism

This session is CPD accredited (3 awarded)

Moderator – Katie Hadfield

Speakers – Claire Hart and Donna Fullerton

09.30 – 10.45	**Survival guide to acute presenting inherited errors of metabolism: key knowledge and strategies for handling cases in non-specialist centres**
10.45 – 11.15	Break
11.15 – 12.30	**Adult inherited errors of metabolism: typical disorders, presentations and diagnosis**
12.30 – 13.00	Lunch break

Scholarship Update

13.00 – 13.15	**Introduction to ACB research and innovation grant** *Alexandra Yates*
13.15 – 13.30	**Linking iron with inflammatory profiles and clinical outcomes in COVID-19** *Joe Frost*
13.30 – 13.45	**Profiling cytokine storm and markers of endothelial dysfunction during severe COVID-19 infection** *Gemma Reidy*
13.45 – 14.00	**Can the measurement of anti-SARS-CoV-2 salivary antibodies enhance the sensitivity of seroprevalence studies and are these antibody responses clinically relevant?** *Adrian Sheilds*

Calculations and Clinical Practice

This session is CPD accredited (3 awarded)

Moderator – Katie Hadfield

Speakers – Brona Roberts, Grainne Connolly, Kathryn Ryan and Paul Hamilton

14.00 – 14.35	**Calculations**
14.35 – 15.10	**Clinical cases**
15.10 – 15.40	Break
15.40 – 16.15	**Clinical cases**
16.15 – 16.50	**Calculations**
16.50 – 17.00	**Final discussion**

Tuesday 15th June

09.30 – 09.45 **Opening remarks and welcome**
Neil Anderson

09.45 – 09.55 **Welcome from Lord Bethell**

LM Session 1: Optimising laboratory services

This session is CPD accredited (2 awarded)

Moderator – Neil Anderson

09.55 – 10.40 **Pathology GIRFT: implications for the Pathology Service**
Martin Myers, Tom Lewis and Marion Wood

10.40 – 10.55 Break

10.55 – 11.40 **Demand optimisation during the pandemic**
Bernie Croal

11.40 – 12.25 **Q and A session/Panel discussion**
Sarah Robinson, Bernie Croal, Martin Myers, Tom Lewis and Marion Wood

12.25 – 13.00 Lunch break

13.00 – 13.40 **Industry Workshop**

SE Session 1

This session is CPD accredited (3 awarded)

14.00 – 14.45 **ACB Foundation Lecture**
Julian Barth
Moderator – Neil Anderson

14.45 – 16.15 **Workshop 1: Big data in laboratory Science**
Moderator – Graham Lee

14.45 – 15.15 **Big data for better health; are we there yet?**
Mark Lawler

15.15 – 15.45 **Improving detection and prediction of AKI using digital and AI technologies**
Chris Laing

15.45 – 16.15 **Intelligent algorithims for the automated assessments of deranged LFTs**
Jenny Nobes

16.15 – 17.45 **Workshop 2: Paediatric biochemistry/pregnancy**
Moderator: Grainne Connolly

16.15 – 16.45 **Angiogenic biomarkers in pre-eclampsia**
Manu Vatish

16.45 – 17.15 **Five year review of expanded newborn screening in England**
Jim Bonham

17.15 – 17.45 **Impact of genomic sequencing on paediatric metabolic services**
Siobhan O'Sullivan

Wednesday 16th June

LM Session 2: Expansion of Pathology – an evolving workforce

This session is CPD accredited (3 awarded)

Moderator – Bernie Croal

09.30 – 10.10 **Diagnostics – recovery and renewal**
Jo Martin

10.10 – 10.50 **Expansion in Virology/Microbiology – the legacy of the pandemic in the short- and long-term**
Rob Shorten

10.50 – 11.05 Break

11.05 – 11.45 **Workforce issues and solutions for Cellular Pathology**
Michael Osborn

11.45 – 12.30 **Q and A session/Panel discussion**
Bernie Croal

12.30 – 13.00 Lunch break

13.00 – 13.40 **Industry Workshop**

SE Session 2

This session is CPD accredited (3 awarded)

14.00 – 14.45 **AACC Lecture**
Brave or not, the direct-to-consumer genetic testing world is here. What's the current landscape?
David Grenache
Moderator – Neil Anderson

14.45 – 16.15 **Workshop 1: Point of care testing**
Moderator – Sumana Gidwani

14.45 – 15.15 **The clinical impact of POCT in Primary Care**
Gail Hayward

15.15 – 15.45 **COVID-19 point-of-care testing**
Tanya Curran

15.45 – 16.15 **Cardiac biomarkers in the ED and Critical Care – to POCT or not POCT**
Paul Collinson

16.15 – 18.15 **Workshop 2: Laboratory medicine and clinical practice**
Moderator: Mayur Patel

16.15 – 16.45 **Challenges after bariatric surgery**
Alex Miras

16.45 – 17.15 **Renal transplant biochemistry: the essentials and beyond**
Michael Delaney

17.15 – 17.45 **Clinical biochemistry of transgender patients**
Hamish Courtney

17.45 – 18.15 **New clinical uncertainty with old markers of acute inflammation and infection**
Paul Dark

Thursday 17th June

LM Session 3: Recovery from COVID-19: How should laboratories be set up and equipped to respond to a pandemic? – Laboratory services in the aftermath of a pandemic

This session is CPD accredited (3 awarded)

Moderator – Neil Anderson

09.30 – 10.15 **Response to COVID-19 within the US**
William Morice

10.15 – 10.30 Break

10.30 – 11.15 **Presentation from the Head of the Genome Programme**
Dame Sue Hill

11.15 – 12.00 **Q and A session/Panel discussion**
Neil Anderson

12.00 – 13.00 Lunch break

13.00 – 13.40 **Industry Workshop**

SE Session 3

This session is CPD accredited (3 awarded)

14.00 – 14.45 **RCPath Flynn Lecture**
Ana Maria Simundic
Moderator – Lance Sandle

14.45 – 16.45 **Workshop 1: Laboratory science of the future**
Moderator – Alexandra Yates

14.45 – 15.15 **Molecular characterization of protein measurands: its time has come. The apolipoprotein (a) example**
Christa Cobbaert

15.15 – 15.45 **The human microbiome in health and disease**
William Wade

15.45 – 16.15 **Cancer genomics in clinical practice**
David Gonzales de Castro

16.15 – 16.45 **CAR-T in clinical practice**
Mahnaz Abbasian

16.45 – 18.15 **Workshop 2: Management for the 21st century**
Moderator: Gareth McKeeman

16.45 – 17.15 **Disruption in healthcare: how the laboratory can add value**
Jonathan Kay

17.15 – 17.45 **The value proposition for laboratory medicine**
Maurice O'Kane

17.45 – 18.15 **Patient-based real-time quality control**
Huub Van Rossum

19.00 – 20.30 **Quiz Time** *hosted by Kevin Deans*

Friday 18th June

SE Session 4: Clinical Cases – including voting

This session is CPD accredited (3 awarded)

09.30 – 12.00 **Clinical Cases Session**
Danielle Freedman, Chair
Nathan Cantley
Tahir Pillay
Sally Kerr
Charles Van Heyningen
Oliver Clifford Mobley
Paul Hamilton
Niamh Horton
Darminga Thayabaran

12.00 – 13.00 Lunch break

13.00 – 13.40 **Industry Workshop**

Medal Awards

Moderator - Neil Anderson

14.00 – 14.05 **Medal Award opening remarks**
Neil Anderson

14.05 – 14.20 **Investigating the accuracy of free phenytoin calculations**
Niamh Horton

14.20 – 14.35 **Automation of the thiopurine S-methyltransferase (TPMT) phenotyping assay using the Biomek NXP and Biomek i5 automated liquid handling workstations**
Rachel Griffiths

14.35 – 14.50 **Enhanced liver fibrosis (ELF™) scoring: a solution to reducing indeterminate fibrosis diagnoses in the intelligent liver function test (iLFT) pathway?**
Jenny Nobes

14.50 – 15.05 **Unwarranted laboratory requests on a busy surgical DGH unit: understanding and addressing the problem**
Chris Pitt

15.05 – 15.45 Break

15.45 – 16.45 **Annual General Meetings**

16.45 – 17.15 **Closing Ceremony**
Speaker – Bernie Croal
Clinical Case Winner
Medal Award Winner
Audit Poster Prize Winner
Clinical Case Poster Prize Winner

ACB National Audit: Call for Abstracts

The submission of abstracts is now welcomed for both oral and/or virtual poster presentation at the forthcoming Online National Audit Meeting scheduled for the 24th September 2021.

Please e-mail your abstract to: **chair.natauditgroup@acb.org.uk** by 5.00pm on Monday 5th July 2021.

Two abstracts will be chosen by the National Audit Group for oral presentation on the day. If you do not wish your abstract to be considered for oral presentation, please indicate on the e-mail. Abstracts will be selected on the basis of current topic of interest and impact and should be 300 words maximum, excluding author(s) and title.

Presenters must be registered delegates at the meeting and should normally be the lead author of the audit. Presentation of audits at a recent meeting, such as UKMedLab21, is not a bar to submitting to this meeting. The top 10 abstracts will be published.

A typical format for an audit abstract is:
Title:
Author(s):
Aim:
Standards / Guidelines:
Audit method:
Summary of results:
Outcome: Audit recommendations ■

Sudoku

This month's puzzle

	E		Y		I		C	
				M				
	S		E		H		I	
		I				M		
		M	C	E	Y	I		
R		H				C		S
I			H		M			T
		Y	T		C	R		

Solution for April

S	M	I	Y	T	H	C	E	R
T	Y	C	E	M	R	H	I	S
E	R	H	I	S	C	Y	T	M
I	T	R	H	E	Y	S	M	C
C	H	E	M	I	S	T	R	Y
M	S	Y	R	C	T	I	H	E
R	C	S	T	H	M	E	Y	I
H	I	M	S	Y	E	R	C	T
Y	E	T	C	R	I	M	S	H

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EFLM Bursaries for EuroMedLab 2021

The EFLM is promoting a bursary programme for young scientist EFLM Academy Members who wish to attend the 24th IFCC-EFLM European Congress of Clinical Chemistry Laboratory Medicine in Munich from 28th November to 2nd December 2021.

A limited number of bursaries are available which will cover the cost of free Congress registration, travel and 4 nights accommodation for a maximum of €900.00.

To apply for a bursary please fill in the **application form** before 5th October 2021. For further information on the Congress please visit:
http://www.euromedlab2021munich.org/

Annual General Meetings

18th June 2021

Due to the ongoing COVID-19 pandemic this year's Annual General Meetings will again take place by audio/video conference immediately prior to the closing ceremony of **UKMedLab21**.We hope you can join us to receive an update on the Association's activities over the past year, hear our aims for the future, and to have your say. **The Association for Clinical Biochemistry and Laboratory Medicine Annual General Meeting** will commence at 15.45 and the **Federation of Clinical Scientists' Annual General Meeting** will commence at 16.25.

The agendas along with minutes of the previous AGMs, details regarding any special resolutions of the Association, and instructions for how to join on the day are available from the Annual Report section of the **website**.

We look forward to welcoming you to the 68th ACB AGM and 24th FCS AGM.

Condolences

It is with regret that we must inform you of the sad news of the deaths of the following Emeritus Members:

Professor Joan Zilva recently passed away. Professor Zilva joined the ACB in 1962 and was awarded Emeritus membership in 1986. During this time she held various ACB positions including National Meetings Secretary (1974-1975), National Member of Council (1979-1981), Chair of the Education Committee (1980-1981) and was a Member of the Scientific Committee (1981-1984). Mr Eric Carlyle passed away last month. Eric was last based in Biggar, Lanarkshire. He joined the ACB in 1968 and was awarded Emeritus membership in 2011. During this time Eric held the positions of Chair of ACB Scotland (1990-1993), Regional Representative on Council (1991-1993) and was a Member of the Scientific Committee (1984-1986, 1996-1998).

Retired Member, Miss Josephine Hewitt, also recently passed away, aged 83. Josephine was last based in Reading and joined the ACB in 1957.

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Science Council – Chartered Scientist (CSci) registration via ACB

The Science Council sets the professional standards for practising scientists and science technicians, independent of scientific discipline. Professional registration proves that you:

- Can apply your knowledge in a professional setting.
- Can work with other people and take personal responsibility for yourself and others.
- Are committed to professional development and personal integrity.

Science Council registered scientists are spread across many different countries, but they all share a commitment to professional excellence. When you become registered, you also join this community of other registered professional scientists. Registration tells others that you are committed to working to high ethical standards and gives them trust and confidence in you as a professional scientist.

Chartered Scientists demonstrate effective leadership, using their specialist knowledge and broader scientific understanding to develop and improve the application of science and technology by scoping, planning and managing multifaceted projects.

By becoming registered, professional scientists agree to be bound by the Science Council's **Model Rules of Conduct for Registrants** as well as the **code of professional conduct of ACB**.

Sign up to the Science Council's online application system at: **sciencecouncil.org/apply**

The ACB Scientific Scholarships are changing . . .

From this year the Scholarships are to be renamed as:
The Association for Clinical Biochemistry and Laboratory Medicine Research and Innovation Grant
Submission and management of the grant process will be via the **ACB website**.
The Scientific Affairs and Clinical Practice Committee will review the applications blinded to the applicants' details.

Key Dates:

Online submission opens:	14th June 2021
Submission closes:	31st July 2021
Applicants informed:	early October 2021

For more information plus an overview of 2020 Covid Scholarship Awards please attend **the Scholarship update session at UKMedLab21** on Monday 14th June 2021, 1-2pm.

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AQMLM Zoom Meetings

Jonathan Middle, Chair, AQMLM

The COVID-19 crisis means we have replaced our traditional networking events with Zoom meetings. All Zoom meetings are free of charge for fully paid up AQMLM members while they maintain their annual subscription. Non-members may attend for a fee of £10.00 per event.

Programme 2021

- **Zoom 13** – 11:00 Tuesday, 22nd June 2021
  Pre-analytical quality challenges
  Mike Cornes from the EFLM Working Group on the Preanalytical Phase will lead this meeting. Finlay MacKenzie will discuss the UK NEQAS PREPQ service.
  N.B. This event is currently full. We are operating a reserve list for all those now registering. Priority will be given to full AQMLM members with current annual subscriptions. They will be offered places on a first-come-first-served basis when we have cancellations. If we have a lot more registrations, we may consider holding a repeat event, but please note that members and account holders can still access the recordings for a nominal fee – please visit the Past Events and Recordings pages.
- **Zoom 14** – 11:00 Thursday, 15th July 2021
  Implication of the Pathology GIRFT on total quality management in pathology
  Presenters: Marion Wood, Tom Lewis and Martin Myers, joint leads of the Pathology GIRFT team
- **Zoom 15** – (planning stage) : w/c 13th September 2021
  The future of COVID-19 testing

Registration

AQMLM Members with current annual subscriptions: just need to send us an email or use the **Contact form** – your participation is free of charge. All members who previously expressed interest in this Zoom have been pre-registered and need not confirm. However, they should inform us if they no longer wish to attend.

AQMLM account holders without annual subscriptions: you will need to pay a £10.00 one-off fee. To pay online, please sign in to your account and click here (indicate which Zoom in the comment field). To pay by bank transfer, please **email us** or use the **Contact form** to request instructions. If you renew your subscription now, this will mean all Zoom meetings up to the end of September 2021 will be free of charge for you.

To create an AQMLM account, **go here**. To participate just as a visitor without creating an account, please **email us** for instructions.

If you have suggestions for future events, please do let us know. Thank you!

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Produced by The Association for Clinical Biochemistry & Laboratory Medicine

With support from The Royal College of Pathologists — Pathology: the science behind the cure; IBMS

Lab Tests Online-UK is a non-commercial website written by practising laboratory medics and scientists with lay editorial review of content to ensure its suitability. The aim of the website is to help patients and the public, including healthcare professionals, understand the many clinical laboratory tests that are used in diagnosis, monitoring and treatment of disease.

LTO-UK fact of the month

As well as being present on our own site, we also have a presence on social media. Check out our Twitter feed @LabTestsUK and our Facebook page @labtestsonlineuk

Meet the Lab Tests Online-UK Board

Technical Lead, Stuart Jones

Stuart is a Consultant Clinical Biochemist at King George's Hospital in East London. He is also the Lead for a network of prenatal screening laboratories in the South East. Early in his career he made the mistake of showing an interest in Pathology IT, which now seems to dominate much of his time!

He became Technical Lead for LTO-UK in 2012 and has played an important role in developing the site ever since. Most recently he set up a mechanism by which organisations, such as GP system suppliers, can link specific test results back to the relevant pages on LTO. With patients now able to access their results directly, this has proved to be a particularly worthwhile development. Around 25% of all hits to LTO-UK now come via systems with these integrated links.

Stuart also has a keen interest in science communication and has worked with charities like Sense About Science to help promote good science and evidence based medicine. You will regularly find him on Twitter fighting the cause!

He spends the rest of his time with his wife, Stephanie, parenting their two (soon to be three) young children and shouting at the television when Luton Town are playing.

How to get involved

Join the editorial team

If you are interested in contributing to the vital work of the editorial team to keep the website up to date and to introduce new material, please contact us for more information. We are looking for people specifically to edit pages on subjects such as adenosine deaminase, aPTT and BRC-ABL.

Become a Lab Tests Online-UK champion

Our Champions promote LTOL-UK within their local hospital or GP surgery. We're always on the lookout for people who would like to let patients know about how we can help them. If this is something that interests you, please contact us via our website or at the email address below.

Email: **labtestsonlineuk@acb.org.uk** Website: **labtestsonline.org.uk** Follow us

Association of Clinical Pathologists

Chemical Pathology virtual monthly Zoom webinars 2021

Thursday 10th June 13:00-14:00
C-peptide in blood and urine clinical value
Dr T MacDonald

Thursday 8th July
To be confirmed

August Summer Break

Thursday 9th September 13:00-14:00
Lipids: PCSK9 inhibitors and novel lipid lowering agents
Dr D Preiss

Thursday 14th October 13:00-14:00
Nutrition: Nutritional concerns before and after bariatric surgery
Dr C Le Roux

Thursday 11th November 13:00-14:00
Parenteral nutrition
Dr W Simpson

Thursday 9th December
To be confirmed

If you would like to register for any of these meetings, please email Rachel Eustace at rachel@pathologists.org.uk ACP members: free of charge (conditions apply)
Non-Members: £10 per webinar or £50 for the year

Publication Deadlines

To guarantee publication, please submit your article by the 1st of the preceding month (i.e. 1st July for August 2021 issue) to:

editor.acbnews@acb.org.uk

We try to be as flexible as possible and will accept articles up to the 20th to be published if space allows. Otherwise they will be held over to the next issue.

If we are aware that articles are imminent, this gives us more flexibility and we can reserve space in anticipation.

If in doubt, please contact Gina Frederick, Lead Editor, via the above e-mail. ■

Deacon's Challenge Revisited

No 14 - Answer

A buffer is required for an enzymatic assay which has a pH of 7.4 and total phosphate concentration of 100 mmol/L. Calculate the amounts of anhydrous sodium dihydrogen phosphate and disodium hydrogen phosphate which need to be weighed in to make 1 L of buffer. The pK of the dissociation is 6.82 (atomic weights: Na = 23, P = 31).

MRCPath November 2001

The relationship between the concentrations of an acid, its conjugate base and the pH of the solution is described by the Henderson Hasselbalch equation:

$$pH = pK_a + \log_{10} \frac{[salt]}{[acid]}$$

The required pH of the phosphate buffer is close to the second pKa so that the dissociation to be considered is:

$$H_2PO_4^- \longleftrightarrow HPO_4^{2-} + H^+$$

Substitute [salt] = $[HPO_4^{2-}]$, [acid] = $[H_2PO_4^-]$, pH = 7.40 and pK_a = 6.82 into the Henderson Hasselbalch equation:

$$7.40 = 6.82 + \log_{10} \frac{[HPO_4^{2-}]}{[H_2PO_4^-]}$$

Rearranging: $\log_{10} \frac{[HPO_4^{2-}]}{[H_2PO_4^-]} = 7.40 - 6.82 = 0.58$

Taking antilogs: $\frac{[HPO_4^{2-}]}{[H_2PO_4^-]} = \text{antilog } 0.58 = 3.80$ .....(i)

Since the required total phosphate concentration is 100 mmol/L (i.e. 0.1 mol/L)

$$0.1 = [H_2PO_4^-] + [HPO_4^{2-}]$$

Rearranging: $[HPO_4^{2-}] = 0.1 - [H_2PO_4^-]$ .....(ii)

Substitute for $[HPO_4^{2-}]$ in equation (i) and solve for $[H_2PO_4^-]$:

$$\frac{0.1 - [H_2PO_4^-]}{[H_2PO_4^-]} = 3.80$$

$$0.1 - [H_2PO_4^-] = 3.80\,[H_2PO_4^-]$$

$$3.80\,[H_2PO_4^-] + [H_2PO_4^-] = 0.1$$

$$4.80\,[H_2PO_4^-] = 0.1$$

$$[H_2PO_4^-] = \frac{0.1}{4.80} = 0.0208 \text{ mol/L}$$

Substitute $[H_2PO_4^-] = 0.0208$ in equation (ii) and solve for $[HPO_4^{2-}]$:

$$[HPO_4^{2-}] = 0.1 - 0.0208 = 0.0792 \text{ mol/L}$$

Now calculate the weights required for each phosphate salt:

Conc (g/L) = Conc (mol/L) x MW

For anhydrous sodium dihydrogen phosphate, NaH_2PO_4:

MW = 23 + (2 x 1) + 31 + (4 x 16) = 120

Weight required per litre = 0.0208 x 120 = 2.50 g

For anhydrous disodium hydrogen phosphate, Na_2HPO_4:

MW = (2 x 23) + 1 + 31 + (4 x 16) = 142

Weight required per litre = 0.0792 x 142 = 11.2 g ■

Question 15

25 mg of bilirubin ($C_{33}H_{36}O_6N_4$) were dissolved in 4 mL of dimethyl sulphoxide; 200 µL of this solution was diluted to 250 mL with chloroform. This solution gave an absorbance of 0.502 when measured in a 1 cm cell against a chloroform blank.

Given that the molar absorptivity of bilirubin under these conditions is 6.07×10^4, calculate the percentage purity of the bilirubin.

MRCPath, May 1995

Microbiology Trainee Representative's report

Laura Atkinson, Pre-registration Trainee Representative for the Microbiology Professional Committee

When I took on the role of Trainee Representative for Microbiology back in 2019, I had no idea I would be the voice of Trainees throughout the biggest global health crisis of our lifetimes. Like others throughout the healthcare science workforce, this year has been the most challenging of our careers, but also the most rewarding. Gathering feedback from my fellow Trainees has never been so important, which is why I've been proud to act as their representative over the past year.

In March 2020, whilst much of the population took on the challenges of remote working, STP Trainees in Microbiology were redeployed to the front-line of the COVID-19 testing response. This gave us valuable real-world experience of validating SARS-CoV-2 PCR tests, research and development of new assays, leading COVID-testing teams and training our colleagues. There's no doubt that this was hugely beneficial to our portfolios and general career experience; I finally knew what it felt like to be a Clinical Scientist! However, none of us could have anticipated just how long our redeployment would last. Fast forward to September 2020 and Trainees reported working evenings, night shifts and weekends to support their Trusts, causing them to miss out on critical study time. Microbiology Trainees report receiving little or no formal training between March and September 2020, and some have since been further redeployed during the second wave over the winter.

With morale at an all-time low and anxiety levels rising, it was clear that more needed to be done to support Trainees who had sacrificed their own training to support the COVID-19 response. This is where the ACB Microbiology Professional Committee stepped in. Clinical Scientists across the UK have selflessly offered up their scientific and clinical expertise in order to help STP Trainees cover competencies which had become near impossible to complete due to the pandemic. Online training has included talks on public health, infection control, sexually transmitted infections, and food and water microbiology, as well as covering professional practice competencies with a session on clinical leadership. Each session has seen a considerable turnout, with Trainees at all different stages of training eager to attend. Feedback has been overwhelmingly positive, with many saying that not only has the online training allowed them to get back on top of their portfolios, but it has also given them an opportunity to see other Trainees (albeit through a screen) and have a much needed catch up.

Microbiology STP Trainees have had an incredibly difficult year, something that I'm sure all those reading this can relate to! We have felt disproportionately affected by COVID-19 compared to other specialisms, and in the early days of the pandemic it felt like the support just wasn't there for us. However, I would like to take this opportunity to thank the Microbiology Professional Committee for

their efforts in providing us with the training and support that we need, at a time when they were already incredibly busy. This can't have been easy and Trainees are extremely grateful.

As the world (and our training!) slowly starts to get back to normal, we should remember the success of these online events, and keep this format in mind for the future of STP training. After all, whether or not there is a global pandemic, there will always be Trainees struggling to sign off those impossible specialist competencies! ■

The Diggle Microbiology Challenge

These multiple-choice questions, set by Dr Mathew Diggle, are designed with Trainees in mind and will help with preparation for the Microbiology Part 1 FRCPath exam.

Question 24 from April's ACB News

Which is the best specimen to send to the Microbiology laboratory for diagnosis of infection?

A. Blood
B. Urine
C. CSF
D. Vitreous humor
E. Biopsy of colon
F. Skin biopsy from nape of neck
G. Stool
H. Nasal Pharyngeal swab

1. Profoundly immunosuppressed patient with funduscopic evidence of retinal necrosis.
2. Person with history of dog bite who is confused, agitated and exhibits hydrophobia.
3. Recent elderly inpatient with perfuse diarrhoea.
4. Person with flu-like symptoms with recent contact with COVID-19 positive person.
5. Person post bone marrow transplant, bloody diarrhoea and neutropenic.

Answers – 1-D, 2-C, 3-G, 4-H, 5-A

Question 25

Which of the following organisms can be associated with dog bites?

A. Pasteurella septica
B. Bordetella pertussis
C. Clostridium perfringens
D. Escherichia coli
E. Bacillus subtilis

The answer to Question 25 will appear in the next issue of ACB News – enjoy! ■

Current and future horizons for lipids in North East England and beyond

Miss Megan Kitching, Senior Clinical Biochemist, Newcastle upon Tyne Hospitals NHS Foundation Trust and Miss Lauren Carroll, Senior Clinical Biochemist, Gateshead Health NHS Foundation Trust

On Wednesday 21st April the ACB regional meeting for Trent, Northern and Yorkshire took place in a virtual format across Microsoft Teams. The meeting was kindly organised by Dr Ann Bowron, Consultant Clinical Scientist at Newcastle upon Tyne Hospitals NHS Foundation Trust, and followed the theme of 'Current and future horizons for lipids in North East England and beyond'.

Recent developments in familial hypercholesterolaemia genetic testing

Dr Ciaron McAnulty, Northern Genetics Service, Newcastle upon Tyne

The morning began with Dr McAnulty who gave a presentation on recent developments in genetic testing in the context of familial hypercholesterolaemia (FH). He discussed the reconfiguration of the genetics service, including the establishment of a network of genomic laboratory hubs, and how this aims to consolidate diagnostic services and enable consistent and equitable access to testing. He also described the development of the national genomic test directory, which went live on 1st October 2019. He briefly touched upon Whole Genome Sequencing (WGS), before describing the current process for FH testing. FH testing is currently delivered as a targeted gene panel but the aim is to move it to WGS in the future. Dr McAnulty discussed interpretation of results, including the criteria for determining variant pathogenicity. He concluded his talk with an explanation of polygenic risk scores, and how they can be used to identify patients who may be at high risk of cardiovascular disease (CVD) due to a polygenic cause of FH.

Optimising diagnosis of FH using bioinformatics

Ms Rachel O'Leary, NICE External Assessment Centre, Newcastle upon Tyne

Ms O'Leary followed with a talk on optimising the diagnosis of FH using bioinformatics. She gave a brief overview of the current NICE guidelines for diagnosis of FH (NICE CG71) which state that FH should be suspected in patients with a total cholesterol >7.5 mmol/L or a family history of premature coronary heart disease. The use of a fixed threshold for FH diagnosis could potentially mean that young people who have a cholesterol that is high for their age, but below the threshold, are being missed.

Ms O'Leary has developed a cholesterol centile calculator, which plots a patient's cholesterol results on a centile, according to their age and gender, and identifies patients who are at high risk of having FH. Ms O'Leary then went on to discuss the high cost of genetic tests, and how being able to identify patients most likely to have a genetic variant would be

beneficial. She spoke about a prototype app that she has developed which is able to predict variant likelihood based on LDL, triglycerides and age. Ms O'Leary concluded her talk with a brief overview of the development of a new electronic request form for FH testing.

Advances in PCSK9i provision in the North East

Dr Purba Banerjee, Newcastle upon Tyne Hospitals

Dr Banerjee gave a presentation on the re-audit of PCSK9 inhibitors (PCSK9i) in the North East of England. The audit was conducted using NICE guidelines TA393 and TA394 as standards. Data was collected from 122 patients from six different Trusts across the region.

Data collected included: indication for initiation of PCSK9i; fasting lipids and post-treatment lipid profiles; and any adverse effects to treatments.

Results from this audit demonstrated that lipid clinics in the North East region were following NICE TA393 and TA394 recommendations appropriately. It also demonstrated that the PCKS9i Alirocumab and Evolocumab are effective and well-tolerated. Comparison with the initial audit showed that the number of patients initiated on PCSK9i treatment has risen, and that the percentage of patients discontinuing treatment has not changed significantly.

ApoB and Beta-quantification in the investigation of hypertriglyceridaemia

Dr Chris Boot, Newcastle upon Tyne Hospitals

Dr Boot discussed the importance of apoliprotein B (ApoB) and β-quantification in the investigation of hypertriglyceridaemia, beginning with familial dysbetalipoproteinaemia (FDBL). Although genetic analysis can be useful to detect the most common causal mutation (APOE2), this can miss rarer forms.

Dr Purba Bannerjee

Dr Boot explained that the definitive investigation is β-quantification – ultracentrifugation of EDTA plasma to separate lipoprotein classes – with an elevated VLDL-cholesterol:total triglyceride ratio diagnostic of FDBL. However, this low-throughput assay is not widely available. To overcome this, ApoB analysis can be used as a screening tool, with an increased non-HDL:ApoB ratio suggestive of FDBL. Dr Boot went on to talk about familial chylomicron syndrome (FCS), which is caused by low lipoprotein lipase activity and is difficult to distinguish from multifactorial severe hypertriglyceridaemia using standard tests. Again, ApoB is a useful screening tool (with low levels seen in FCS) to identify those who may require further investigations, such as genetics and β-quantification.

An assay for atorvastatin: pitfalls and an unexpected surprise

Dr Liz Robinson, Northumbria NHS Foundation Trust

Dr Robinson spoke about the difficulties of monitoring statin therapies, and described the set-up of an atorvastatin assay at Northumbria. She talked about the complexities of the variable pharmacological response to statins, and the mechanisms of toxicity that lead to poor adherence. Measurement of statins and their toxic metabolites (lactones) may be able to help with these problems, but there is no current reference method.

Dr Robinson described an LC-MS/MS assay they have developed to measure plasma atorvastatin, which has shown acceptable analytical performance, and is a viable method for determining adherence. However, atorvastatin lactone is currently too unstable to measure, so further work is planned to overcome this. Northumbria also plan to carry out studies to determine the expected atorvastatin concentration at different doses and times, as well as to develop a urine screening method and methods for alternative statins, with the ultimate aim of providing an exciting new therapeutic drug monitoring service.

Screening for lysosomal acid lipase deficiency in dried blood spots

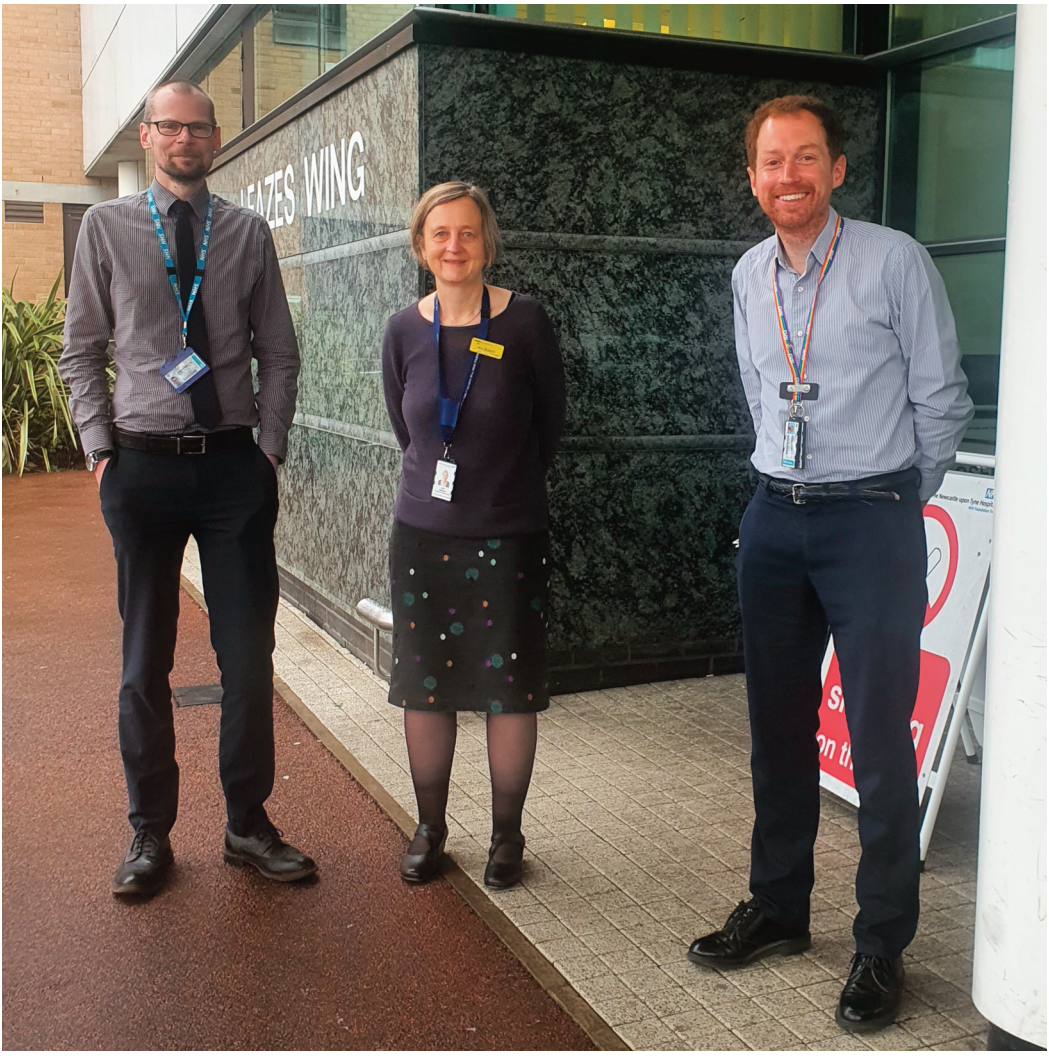
Dr Marianne Barr, Queen Elizabeth University Hospital, Glasgow

Dr Fiona Jenkinson, Newcastle upon Tyne Hospitals, chaired the afternoon session of this meeting, with a shift in focus from pure lipids to lipids and metabolic conditions. The first talk came from Dr Barr, who spoke about screening for lysosomal acid lipase deficiency (LAL-D) using dried blood spots (DBS). Dr Barr explained that diagnosis is based on direct measurement of LAL enzyme activity, historically in fibroblasts/leucocytes, but now in DBS. She highlighted the benefits of DBS screening, and described the assay methodology, which uses LALISTAT, a specific inhibitor of LAL, to address the presence of other lipases in whole blood. It is a highly sensitive method of screening, with clear differentiation between the normal activity range and that of affected patients. Finally, Dr Barr discussed the limitations of the assay and how some of these are overcome by use of a control enzyme (β-galactosidase) to check sample quality.

Non-cholesterol sterols in hyperlipidaemia and metabolic disease

Dr Ann Bowron, Newcastle upon Tyne Hospitals

Dr Bowron talked about non-cholesterol sterols in hyperlipidaemia and metabolic disease, raising some interesting unanswered questions. The first part of the discussion focussed on the absorption and synthesis of non-cholesterol sterols, and the related inherited metabolic disorders of sitosterolaemia and Smith-Lemli-Opitz syndrome (SLOS). Both of these disorders can be detected via genetic and biochemical analysis, with biochemical testing for sitosterolaemia involving phytosterols analysis, and testing for SLOS involving plasma sterol measurement, specifically plasma 7-dehydrocholesterol. The next part of the discussion addressed the inverse relationship between cholesterol synthesis and absorption, and the distinctive patterns in different metabolic disorders, which may offer the potential for disease-specific lipid-lowering therapies. Finally, Dr Bowron raised the idea that absorption sterols may contribute to CVD risk, and described a study into the use of baseline sitosterol measurement



Dr Chris Boot, Dr Ann Bowron and Dr Chris Stockdale

as a marker of sterol absorption, which may have the potential for directing personalised lipid-lowering strategies in acute coronary syndrome (ACS) patients.

A newly described inherited cause of dyslipidaemia

Dr Chris Stockdale, Newcastle upon Tyne Hospitals

Dr Stockdale described glycerol-3-phosphate dehydrogenase 1 (GPD-1) deficiency as a rare inherited cause of paediatric dyslipidaemia and hepatomegaly. He began with an overview of the metabolic pathways and functions of GPD1, which is a cytosolic enzyme linking glucose and triglyceride metabolism. He then moved onto GPD1 deficiency, which has been reported in only 18 patients, many of these from the same few families. It usually presents within the first year of life, with hypertriglyceridaemia the major biochemical feature, although the

mechanism is unclear. Hepatomegaly is the major clinical feature, and raised transaminases are common, with hepatic steatosis seen in all patients. GPD1 deficiency has been managed with off-label fenofibrate therapy to lower triglycerides, although this may not improve the hepatic steatosis. The main take-away point was that GPD1 deficiency should be considered in the differential diagnosis of infantile hepatomegaly and fatty liver, particularly where there are elevated transaminases and hypertriglyceridaemia.

Natural history and genetics of chylomicronaemia syndrome: what we know and new data from the UK FCS register

Dr Paul Downie, Salisbury District Hospital and Bristol Royal Infirmary

Following a short break, Dr Downie gave a presentation on the natural history and genetics of familial chylomicronaemia syndrome (FCS). He began with an introduction to FCS, including the pathophysiology, clinical features and common genetic mutations. He moved on to discuss the validation and implementation of a genetic panel test for patients with suspected FCS or severe hypertriglyceridaemia. The test is a next generation sequencing assay that targets eight genes associated with FCS.

Dr Downie provided some interesting case studies to demonstrate utility of the test. He then went on to speak about ongoing work evaluating an FCS scoring tool, which is to be used as a way of refining the eligibility criteria for FCS screening. He concluded his talk with an overview of the FCS registry, which is a central repository for FCS variant data. It is hoped that the registry will improve the understanding of the genotype/phenotype relationship and patient treatment response.

Lipoprotein (a): When and how to measure it

Dr Dermot Neely, Newcastle upon Tyne Hospitals

Dr Neely concluded the event with a talk on lipoprotein (a) (Lp(a)). He began his talk with an overview of Lp(a), demonstrating its pro-atherogenic functions and association with coronary heart disease. Dr Neely explained that Lp(a) is a good indicator of cardiovascular risk, but that conflicting evidence over the years has prevented it from being fully accepted into routine clinical practice.

He then moved on to talk about Lp(a) measurement and the associated inaccuracies and variability that is seen across different Lp(a) assays. Of all the available assays, the DENKA immunoassay (produced by Denka Seiken) shows the best correlation with IFCC/WHO reference material. Therefore, currently only assays based on Denka reagents, with calibrators traceable to WHO/IFCC reference material, can be recommended.

Dr Neely concluded his talk with a summary of the 10 statements on Lp(a) taken from the HEART UK consensus statement published in 2019. ■

The pandemic, the pathology response and the role of the ACB

Mrs Ruth Lapworth MBE

The 10th meeting of the Retired Members' Group, the first to be held virtually, took place on Monday 29th March. This was the first meeting of the group since 2019 and it was not certain how popular a virtual format would be, as social contact and in-person networking with past colleagues are an important component of the group's meetings. However, the advantage of a virtual format meant that more members from a wider geographical area could participate, and this proved to be the case with the attendance of 60 participants compared to an average of 30 for previous meetings.

The invited speaker was ACB President Professor Neil Anderson, who had agreed to talk on 'The pandemic, the pathology response and the role of the ACB'. Professor Anderson proved that he was well placed to address this topic and gave an excellent presentation showing the dramatic effect the pandemic has had on pathology during the past year, and the ways in which services and staff have responded to meet the challenges.

Professor Anderson began by stating that the pandemic has resulted in "uncertain testing in uncertain times". He described the considerations and risks of the different types of test for COVID-19 and a timeline of the milestones in the development of testing during the early part of 2020. This was followed by an outline of the testing structure and strategy for detecting COVID-19, with information on the differences between the UK Government's pillars of COVID-19 testing.

He described the rapid development of the NHS arm (Pillar 1) of the government's testing strategy which resulted in a variety of high throughput PCR tests and rapid lateral flow tests (LFTs) being used. He anticipated that saliva samples will replace swabs for rapid testing by using loop mediated isothermal amplification (LAMP) in the near future.

The introduction of a variety of new methods for testing, a massive increase in capacity in such a short space of time, and pressure on turnaround times meant that staff had to be redeployed from other pathology disciplines. Additional staff were also recruited from local universities and volunteers were also used to carry out some tasks. Staff were needed for the technical requirements of testing but also for booking in samples, handling the results, and reporting them to a number of locations including Public Health England, internal NHS Trusts and NHS England, each with different reporting requirements.

Professor Anderson emphasised that during the pandemic pathology staff have worked tirelessly to support these dramatic changes in working practice, in some instances coping with sickness rates as high as 25%.

He reported that although non-COVID work had decreased dramatically in some areas, there had been increased laboratory support required for acute hospital admissions with more requests for tests such as inflammatory markers. However, concerns remain about the ability of laboratories to cope with the restoration

of testing to pre-pandemic levels if staff shortages continue.

Pillar 2 of the testing strategy involves the community testing undertaken by the Lighthouse laboratories; currently these results do not enter the patient record. Pillar 3 encompasses antibody testing and is entirely run by the NHS. Delivery of this arm of the strategy was a huge logistical achievement. Incredibly, there was only 48 hours' notice given between the signing of contracts for reagents and NHS laboratories going live with antibody testing.

A new role of Pathology Incident Director (PID) was introduced in March 2020 to support the rapid movement of information to the NHS Pathology Networks. Nominated PIDs are usually the Senior Responsible Officer (SRO) for testing in each network. They represent the networks at national calls and act as the focal point for all information updates from both the national and regional teams. These roles take significant time and have been carried out by staff acting above and beyond the day job.

In the opinion of Professor Anderson, the pandemic has had some benefits for pathology services. These include demonstrating the importance of the role of science and scientists, a significantly raised profile for pathology services, more resilience from working in a network, and in some cases additional investment in infrastructure and IT.

Professor Anderson ended this part of the presentation by outlining the role of the ACB during the pandemic.
The Association had focused on public affairs, communications and provision of information. *ACB News* has moved to online access only and the *Annals of Clinical Biochemistry* has become an open access journal. Since the start of the pandemic the Association has given 19 media responses, been mentioned 23 times in the media and the **www.labtestsonline.org.uk** website has been visited more frequently than before.

In the second part of his presentation Professor Anderson outlined the strategic principles of the ACB and its aim to be the UK's leading scientific society for Laboratory Medicine. He went on to describe the governance and committee structure of the Association, plans for national and regional meetings, training, developments in communications including the website and social media, and ACB links with industry.

Retired Members are asked to send any comments on the strategy, and ways in which they could contribute to the Association, to the President.

Another meeting is planned to take place later in the year with the format dependent on circumstances. ■

Industry Insights: June 2021

Doris-Ann Williams, Chief Executive, BIVDA

There are a number of issues on the industry agenda currently although COVID-19 remains one of the most significant both in terms of products but also on managing commercial and business activity.
The Government has been supporting growth of manufacturing capacity in our sector, especially for companies producing lateral flow tests, with the anticipation that we will need a sustained production of several million per day if the population widely bring testing into their lives as a routine task. The NHS branded tests being provided now are being imported under the Emergency Use Authorisation so many of you will have spotted the test kits aren't CE marked. (Indeed, they often have missing instructions or other issues which should be reported to MHRA). At some point after 21st June it is likely that the Government will stop supplying free tests as widely and people or their employers, local councils and schools will have to start purchasing tests.
At this point they will need to be CE marked.
The Government is going a step further with controlling tests for the private sector as it intends to bring in an additional validation step above the current regulation so it will become illegal to sell COVID antigen tests that aren't UK approved – this applies to the PCR tests used in private testing laboratories (even if UKAS accredited) as well as lateral flow tests. Industry does not agree with this, MHRA have not been involved but we are now focussing on a dialogue to ensure the process is robust and fair. Testing by the NHS will not be affected by this as it purely applies to private sector purchases.

The development of the UK medical device and IVD regulations are also something on our agenda along with supporting companies to meet the new IVD Regulation in the EU (the implementation of this may now be delayed until May 2023 due to the pandemic). Industry is hoping that either the UK regulation will be a 'cut and paste' from the EU IVDR or that there will be mutual recognition of regulations, as a different system would be a big additional cost burden to manufacturers and could result in some tests not being provided to the UK market. Any test on the market under the 2003 IVD directive will be allowed to be sold in the UK until the end of June 2023.

Environmental concerns are coming to a head from a variety of initiatives around the globe.
BIVDA fully supports minimising environmental impact and working on sustainability and have just launched an Environmental working party. Single use plastics are one aspect of this and is an area in which IVDs are

heavily 'reliant' – including all the consumables to package reagents and perform testing. This has been compounded with all the lateral flow cartridges being used for COVID-19 testing. There is at least one UK company developing a soluble plastic for lateral flow cartridges and these sorts of developments will become increasingly significant. At BIVDA we are supporting a recycling scheme, from ReWorked GB (**www.reworked.com**), where used PPE and test cartridges can be recycled.

We are also continuing our activity on getting routine and non-COVID-19 testing resumed with #DontWaitAct through social media, and on the development of the diagnostics sector post-COVID-19. So, a busy summer ahead for BIVDA and our member companies and looking forward to more real interaction again after 21st June. ■

ACB News Crossword

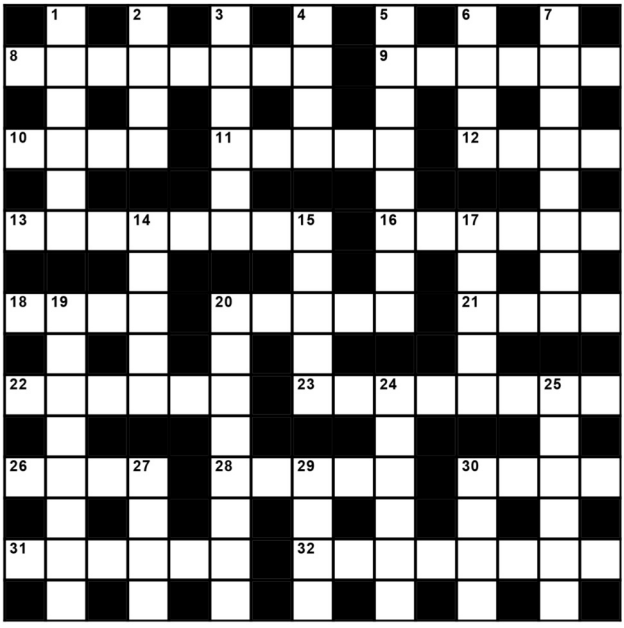
Set by Rugosa

Across

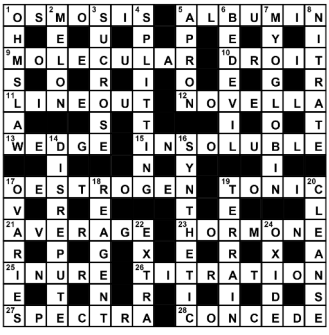
8 Pessimistic: cancel about four (8)
9 Disturbing alert against movement (6)
10 Rejection of French internet connection (4)
11 Exceptional latitude – let off financial scrutiny (5)
12 Present a biased view of revolution (4)
13 Light turned out here late (8)
16 Perennials lacking rain give rise to low spirits (6)
18 Contingent measure (4)
20 Treats diagnoses without gain (5)
21 Tenor sounds bigheaded (4)
22 Wins a large number (6)
23 Astute artist gets to exceed demand (8)
26 Check stock (4)
28 Express discomfort about gas (5)
30 Staunch company (4)
31 Enemy negotiated with initial 'zero option proposal' for possessor of active site (6)
32 No sample transport for tumour (8)

Down

1 Return chemical vessel (6)
2 Infamous centre for operations (4)
3 Enlarge, blow up detail (6)
4 Metal tip (4)
5 Ranks immediate operations (8)
6 Retest not needed – smear tests reveal tumour (4)
7 Disease recurs in central Iberia (8)
14 Record content of parenteral infusion (5)
15 Records surgical schedules (5)
17 Admirer of Liberal past (5)
19 NICE holds review into an addictive substance (8)
20 Cut out case studies about complaints (8)
24 Musculoskeletal tissue damaged, portending loss of grip (6)
25 Infection hurts his head badly (6)
27 Rent-free monetary break for US clinic (4)
29 Information elucidating initial cell structure (4)
30 Row back in love life (4)



Solution for April Crossword



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