

private prescription

More songs o' science

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In an earlier article on this subject [1] I attempted to illustrate the diversity of songs on science by presenting examples of lyrics composed by scientists and set to well-known tunes. The article generated so much interest with readers proffering comments, suggestions and even examples from their personal repertoires that a follow-up article concentrating on the use of the medium in education and general entertainment was unavoidable.

Educational songs

Several readers pointed out that, in my original article, I failed to include any examples from Professor Harold Baum's book *The Biochemist's Songbook* [2]. One reader even quoted several of the lyrics from memory. Needless to say I immediately purchased the book, now in its second edition, and fully agree with all the sentiments expressed. The book contains 19 songs, each describing one of the major biochemical pathways set to tunes such as *Waltzing Matilda*, *The battle hymn of the Republic*, *The red flag* and *Cwm Rhonda*. An example set to the first tune describes the citric acid or Krebs' cycle and illustrates Baum's expertise in writing ballads:

Once a jolly pyruvate enters the matrix
Of a mitochondrion, so they say,
A decarboxylating, complex
dehydrogenase
Converts it to acetyl co-enzyme A.

With the refrain repeating the vital detail:

Waltz round the cycle
Waltz around the cycle
Waltz around the cycle
A decarboxylating, complex dehydrogenase
Converts it to acetyl co-enzyme A.

After three other stanzas and choruses, the final stanza completes the cycle:

Succinate's oxidised by its dehydrogenase
Reducing FAD giving fumarate;
Fumarase makes malate; another
dehydrogenase
Generates oxaloacetate.

Again the chorus repeats the vital detail:

Waltz round the cycle
Waltz around the cycle
Waltz around the TCA cycle, mate
Fumarase makes malate; another
dehydrogenase
Generates oxaloacetate.

The songs were originally composed by Baum on his way to and from work at King's College, University of London, on the upper deck of a London bus. With encouragement from Sir Hans Krebs, the 1953 Nobel laureate for Physiology and Medicine, the songs were first collated and published in 1982. In his foreword to the first edition Krebs remarked: 'the songs are skilful, witty and amusing. They may even help the student get over examination hurdles; they will certainly give much pleasure.'

Judging by the esteem in which these songs are held by readers, it would appear that Krebs'

A thought-provoking
tonic on the lighter side



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prediction over twenty years ago has been fulfilled.

Sheldon Campbell (Department of Laboratory Medicine, Yale University School of Medicine) sent me copies of four songs that he regularly performs with guitar, lecturing to second-year students in medical microbiology. My favourite is entitled *When the ticks go marching in* to the tune of *When the saints go marching in*:

From the blood of mice and deer
To the people once again
They are going to cause infection
When the ticks go marching in.

With the chorus:

Oh, when the ticks go marching in.
Oh, when the ticks go marching in.
I don't want to be infected,
When the ticks go marching in.

Other stanzas include:

Your head it is a-pounding
Your joints, they hurt as well.
If the rash has central clearing,
It could be Borrelial.

And:

If your white cells are a-falling
And your platelets dropping too.

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Better think about Ehrlichia,
Cause its prob'ly not the flu.

Campbell also includes an antiphonal chorus to be sung to the tune *Swing low sweet Chariot*:

For Lyme, it's ceftriaxone
Ampicillin, doxycycline.
For rickettsia, and Ehrlichia,
Treat 'em with doxycycline.

It is now possible to indulge oneself with a book and several CDs

I particularly like this chorus as it adds an element of scientific learning not generally found in songs that parody the subject. Another of Campbell's songs, sung to the tune *Home on the range* and entitled *Home in the gut*, relates the lifecycle of various parasitic worms that inhabit the human gut. The chorus reflects this:

Home, home in the gut
Where the worms play in cheerful delight,
Where the ova are shed, and the larvae
are bred
And the pinworms crawl out at night.

The stanza on the hookworm is particularly gruesome:

Oh hookworm am I, my ova go by
In your stool and then hatch in the mud.
They punch through your skin, and
migrate again
To the gut, where they suck out your blood.

As is the stanza on the Chinese liver fluke:
I live in the stream of bile that's green.
I'm Clonorchis, so please get it right.
And my life's greatest wish is to enter a fish
And then you, with your sushi, tonight.

Campbell reports that his students regularly sing along and he believes that this helps them to remember the material.

General entertainment

Another academic who, in his capacity as professor of pathology at the University of California San Diego School of Medicine, won two prestigious teaching awards because of his unique method of teaching complex medical subjects in song or poetry, is Stephen Baird. However, unlike most academics, Baird has gone one stage further. Not only does he write original tunes to his lyrics but also he has created a whole new genre of music called Scientific Gospel. He now has a band called *The Opossums of Truth* and regularly releases CDs to public acclaim. The idea is to impart scientific knowledge, discuss social and political issues and argue for rational inquiry and thought. Evolution, gravity, water, heat, sexually transmitted diseases and heroes of science have all been subjects for Scientific Gospel. In an interview Baird recently defended his stance (www.scientificgospel.com): 'the basic idea is that reality can be just as much fun as mythology. Science has a lot of interesting phenomena that we've discovered – we just sing songs about that in much the same way that gospel songs sing their story... we just decided there was enough in science to make it fun'.

A good example of Baird's style, relevant to drug discovery and development is *Prayer or penicillin* from his CD *Hallelujah evolution*:

Is it prayer or penicillin that makes
bacteria die?

Faith or plate tectonics that moves the
mountains high?

You go light some incense the next time
you get croup.

But give me penicillin, the thinking man's
chicken soup.

Back in the bad old days when someone
got sick,
We tried to treat malaise with a prayer or trick.

Here's what happened, just in case you've
not heard or read,
We usually fell from grace and would
wind up dead.

Say you were frolicsome and you caught
the clap.

You've got a discharge from somewhere
near your lap.

Will the microbes you display leave you
without a shot?

If all you do is pray, very likely not.

It is not surprising that lyrics like these promote different reactions from different sections of society but Baird's reputation increases with each new CD.

Final words

So there you have it! For those who are interested in singing songs o'science either for education or entertainment, it is now possible to freely indulge yourself. You do not need to search through endless journals and magazines for examples. There is now a handy paperback book with both words and music [2] and several CDs of recorded songs (www.scientificgospel.com). Enjoy!

References

- 1 Rowe, R. C. (2004) Sing a song o'science. *Drug Discov. Today*, 9, 57–58
- 2 Baum, H. (1995) *The Biochemist's Songbook* (2nd edn) CRC Press

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