

agonists decrease striatal dopamine synthesis¹³. Accordingly, the potent A₂ receptor agonist N⁶-(2,2-diphenylethyl)adenosine has a behavioral profile similar to that of dopamine receptor antagonists currently used as neuroleptics in the treatment of mania and schizophrenia¹⁴. In this context it is of interest that schizophrenic relapses in patients have been observed in association with caffeine¹⁵.

In summary, while the presently available experimental evidence on the exact role of adenosine in the pathophysiology of psychiatric diseases is far from conclusive, there are promising results suggesting that adenosine receptor agonists may have a role as hypnotics, anxiolytics and possibly also neuroleptics. As has been found for other anticonvulsants¹⁶, centrally active and preferably

selective adenosinergic drugs like receptor agonists, uptake blockers and deaminase inhibitors may finally prove to be useful not only in neurological, but also in psychiatric diseases.

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SPECIAL FEATURE

Archives of the Catecholamine Club, twenty years on

THE CATECHOLAMINE CLUB was first instituted in the USA in 1968 as an almost spontaneous event. Once initiated by **Julius Axelrod** and **William Manger**, it took on a life of its own, cropping up at each subsequent annual meeting of the Federation of American Societies for Experimental Biology. The exact history has been lost in the nostalgia of the smells of salt water, taffy and sea breezes, familiar to those scientists who used to attend the early FASEB meetings when they were regularly held in Atlantic City, New Jersey.

Those who have attended meetings through the years have been treated to vigorous intellectual exchanges and a chance to participate in the maturation of a field of investigation which has changed dramatically during this time. Most of all, the annual meetings have provided the opportunity to maintain ties with fellow investigators.

At the inaugural meeting, **Julius Axelrod**, the first President of the Club, spoke about the effects of reserpine on the storage of nor-epinephrine. We all remember

1970, the year that the Nobel Committee selected Julie as recipient of the Nobel Prize in honor of his work in the field of catecholamines.

Richard Crout followed Julie as president and invited **Jacques Glowinski** as the speaker. Rumor has it that Julie spoke to **Irwin Kopin** in a stage whisper: 'I'm not going to do this again - you want to be the next president don't you?'; Dr Kopin was immediately elected by acclamation. Since then, 18 presidents have been nominated in a whisper and elected by acclamation. **Solomon Snyder**, the

fourth Catecholamine Club president, remembers his tenure as the year of the 'Great Debate'. The two chosen speakers had opposing views about the nature of catecholamine binding. **Bob Lefkowitz** had published that binding was associated with β -adrenoceptors, while **Pedro Cuatrecasas** in attempting to replicate the data had found instead that catecholamine binding was associated with a membrane-bound form of catechol-O-methyltransferase. There followed one of the most spirited debates ever witnessed at a scientific meeting. Bob Lefkowitz held his position without flinching, however, and soon thereafter began the brilliant opus that has continued to this day, characterizing β -adrenoceptors and other receptors by ligand binding techniques.

The fifth president, **Floyd Bloom**, recalls his tenure fairly accurately since he had to give his talk while wearing a leg cast.

Norman Weiner was the sixth president but best remembers the succeeding Catecholamine Club dinner meeting presided over by **Sidney Spector** at which he was one of three speakers. **Irwin Kopin** and **Erminio Costa** were the other speakers and were engaged in a debate on data on the turnover of radioactively labeled catecholamines and possible implications

of those results for different sub-cellular 'pools' of catecholamines. The scientific nuances have blurred with the passage of years, but the vigor of the debate - eventually reaching a pitch that resulted in a dinner roll being launched as a ballistic missile to accentuate a point - has not faded with time. Sidney Spector tried in vain to interrupt this discussion so that he could introduce Norman Weiner as the next speaker. Finally, Sidney seated a beautiful, young graduate student between the two combatants and peace resumed. There is a rumor that this student was **Inga Hanbauer**, who subsequently became Mrs Costa - the first recorded matchmaking by the Catecholamine Club.

Menek Goldstein was the next president and he remembers a number of gloomy predictions that catecholamines were out of fashion and the days of the Catecholamine Club numbered. However, the eternal fire of the Catecholamine Club was still burning. **Erminio Costa** was the next president and the speaker

Perry Molinoff discussed the purification of the β -adrenoceptor. Perry assumed the throne the next year and remembers extensive discussion on the use of urinary metabolite levels to unravel the etiology or pathophysiology of schizophrenia from an earlier Catecholamine Club meeting. Perry garnered **Barry Hoffer** as the speaker; Barry responded by giving a scintillating talk entitled: 'The effect of brain on 6-hydroxy-dopamine'.

Following Perry, the Catecholamine Club entered a new age, with the election of **Charles (Chip) Rutledge** as the eleventh president. Chip wanted a large attendance at the Catecholamine Club meeting in Dallas in 1979 and urged all his friends to come and listen to the program. Howard Schneider's wife Leslie asked: 'What is a Catecholamine Club?' Chip responded that it was a proper club with a proper song. When Leslie then indicated that her attendance was dependent on hearing the club song, Chip immediately wrote it and did

indeed sing it - to the tune of 'Stout-Hearted Men' - at the dinner meeting. This is how the power of the song was inserted into the Catecholamine Club genome. In 1986 Chip composed a second verse, and in 1988, in keeping with the expanding progress in catecholamine research, Charlotte Granholm and Barry Hoffer added two further verses.

Ray Fuller was the twelfth president, a position he accepted before realizing that a new bylaw required the presiding president to lead in the singing of the Catecholamine Club song. This new bylaw didn't trouble the next president, **Cyrus Creveling**, who is an accomplished singer and promised to lead the assembly in song at future Catecholamine Club meetings. During Cyrus' tenure, a major change occurred. **William Manger** and his secretary, **Mille Hulse**, who had faithfully held the club together for 13 years, maintaining an address list of over 700 scientists and handling the meeting room reservations, menu and tickets, understandably asked that



Irwin Kopin, Theodore Slotkin, Emanuel Diliberto and Walter Dixon share a drink at IUPHAR.

The Catecholamine Club Song

(Tune: Stout-Hearted Men)

Give me amines that are catecholamines that will bind to
the membrane receptor.
Start with tyrosine, dopa, dopamine and they'll soon
give epi- and nor- for
Synthesis and storage, release and reuptake take place as
they 'compish their chore.
When you need transmitters you can always count on
them.

When you walk with a shuffle and you can't move a
muscle and your life has been filled with remorse,
From the lab of Hornykiewicz it was clear that there was
damage which shoulda been enough to kill a ho-orse.
What you need is dopamine that's a catecholamine
formed from levodopa, why of course.
When you need transmitters you can always count on
them.

It can be inhibition that shatters your vision 'cause in
war and in love we are blind.
When your firing rates go wacko and your instincts run
staccato excitations are the ones that come to mind.
Plus and minus are both seen for each catecholamine in
the cortex or in the brain stem.
When you need transmitters you can always count on
them.

When you're fighting or shouting or downright
knockouting put your faith in the adrenaline
Or in good vibrations. It might well be true sensations,
you can trust what receptors have seen.
Though you act like a teen due to catecholamine don't
feel dizzy from collar to hem.
When you need transmitters you can always count on
them!

the reins be turned over to someone else. The administrative support of the club was turned over to Richard Weinsilboum and Gertrude Tyce. The club gratefully accepted Dr Manger's resignation and immediately elected him president for the next year – some justice!

The following year Gertrude Tyce became president and invited Peter Kissinger from Bioanalytical Systems Inc. and Ralph Adams from University of Kansas as speakers. They introduced to members the emerging technique of HPLC with electrochemical detection for the separation and measurement of very low levels of catecholamines. This technique spawned a revolution in catecholamine research and was particularly impressive to those members of the Catecholamine Club who could remember the days of paper chromatography. Between 1983 and 1988, Biological Abstracts list 1500 publications which report using HPLC with electrochemical detection.

Leon Goldberg became the next president and his tenure was marked by a significant oversight. He forgot to elect the next president.

Richard Weinsilboum, elected president for 1984–1985, organized a presentation on catecholamine molecular biology. However, his most vivid memory of a personal presentation at a Catecholamine Club meeting was one which he

made as Secretary–Treasurer. The finances of the club were tenuous. Bankruptcy had been avoided during Bill Manger's tenure as Secretary–Treasurer but the added inflationary costs required that ticket prices be increased. To convince the membership of this necessity Richard made a series of diazo slides to illustrate the Annual Treasurer's report – a departure from usual procedure. After completing what he considered a lucid description of the club's fiscal situation, Richard was left speechless when Norman Weiner rose to ask for a vote of no confidence since the Secretary–Treasurer had squandered Catecholamine Club funds to make slides depicting the dismal financial situation of the club. However, after Richard offered to resign, the vote of no confidence was not passed.

Walter Lovenberg was selected to be president for 1985–1986, but since he was in the midst of moving from NIH to Merrill-Dow

he was not certain he could handle the responsibility of the position. However, Gertrude Tyce assured him that the president only has to do two things: select a speaker and select the next president. Gertrude forgot that the president must also lead the club in song.

Vincent DeQuattro and Otto Kuchel were the two succeeding presidents. The current president is Walter Dixon who looks forward to his brief opportunity for immortality in New Orleans on 21 March this year.

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• The founder members of the Catecholamine Club were J. Axelrod, E. Braunwald, J. R. Crout, U. S. von Euler, W. M. Manger, G. G. Nahas, S. Udenfriend, K. G. Wakim and H. Weil-Melherbe.

Erratum

Energetics of conformational changes in receptors, by Frederick J. Ehlert (November 1988, pp. 393–394). The equilibrium scheme at the top of column 3 on p. 393 should read as shown on the right. We apologize for this error.

