

Old MacDonald Named a Compound: Branched Enynenynols

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What if Old MacDonald has left his farm to become a professor of organic chemistry? What if his students think that organic nomenclature early in the first semester of organic is dry and boring? What if they tell him that all the interesting and relevant compounds that Professor MacDonald assigns as good drill problems in nomenclature are dull and meaningless? After all, they have not yet learned enough organic to appreciate molecules whose interest and relevance are connected to synthesis or reactivity or physical properties or spectroscopy or biochemistry or anything else that is important to Professor MacDonald as an organic chemist. And what if distant memories of that

far-off farm awake again in the mind of good old Professor M.?

Molecular structures that remind him of what he used to have on his farm begin to creep into his mind on little atomic feet (along with a few others from the zoo). Soon he is humming softly to himself ("en-yn-en-yn-ol") as he prepares a couple of examples to share with his class in lecture, a few more as an extra set of homework problems, another for a quiz, and a nicely challenging one for the final exam. He was helped in his work by the advice of his colleagues, who directed his attention to felcene, snoutene, basketane, and some other known polycyclic structures

Table 1. Names of Some Branched Enynenynols

Trivial Name	Structure	Suggested Chemical Name
Oldmacdenynenynol		6-(6-(3-(1-ethyl-1-methylpropyl)-hex-4-ynyl)-4,4-dipropyl-2-prop-2-ynylcyclohex-2-enyl)-4-methyl-cyclohept-2-en-1-ol
Cowenynenynol		(Z)-6-(2,3-diethylcyclopent-2-enyl)-7,7,10,10-tetraethylcyclodec-8-en-2,4-diyn-1-ol
Turkenynenynol		2-(3,3-diethynyl-2,4-divinyl-6,6-diisobutylcycloheptyl)cyclopropanol
Goosenynenynol		(2E, 4Z)-13-cyclopropylcyclo-tridec-2,4-dien-8,10-diyn-1-ol
Serpentenynenynol		(Z,Z)-11-(2-isopropylcyclopentyl) undeca-6,10-dien-4,8-diyn-1-ol
Giraffenynenynol		(4Z,7E)-12-cyclopropyl-3,6,6-triethyldodeca-4,7-dien-9,11-diyn-3-ol
Duckenynenynol		(Z)-4,4-diisobutyl-3-(4,4-dimethylcyclobut-2-enyl)-2-prop-2-ynyl-2-but-1-en-3-ynylcyclopentanol

from the literature (1).

He considered beautiful polycyclic structures briefly, but decided that polycyclics were just a little too complicated for his first-semester students. What they needed first was help and practice in naming branched molecules. The structures of the molecules that he finally settled on are shown here with the trivial names that resulted when he indulged himself in the "joy of christening" (2). You are invited to name them according to the rules of nomenclature found in the introductory organic text in use at your institution. Students assigned to name these structures will be forced to practice naming cyclic unsaturated alcohols with branches: some cases of multiple branches, some unsaturated branches, some cyclic branches, and some branches on branches. Suggested answers (prepared according to rules of nomenclature in a typical current introductory organic text) are given in Table 1.

Professor MacDonald is pretty happy with these molecules because they appeal to the sense of humor in the sophomore students that he teaches and because they can be modified as assignments for use in other parts of his course in organic chemistry. For example, alkanes that are easier to name than these are obtained by dehydrating the alcohols followed by catalytic hydrogenation. Compounds with additional functional groups can be obtained by oxidizing alcohols to carbonyl groups or by replacing them with

amines, etc. As soon as he has covered stereochemistry, he will assign redrawn structures of these same molecules for exercises in assigning *R* or *S* to chiral centers. The reason why the structures shown here all have the same functional groups is that Professor MacDonald's trivial names (shown beside the structures) all rhyme, and he has always had a soft spot in his heart for poetry.

Now that Professor MacDonald has thought up their structures, he is considering their application in more advanced classes. Some of them, for example, should have pedagogically interesting spectra. He is also actively recruiting advanced undergraduate students to plan their syntheses and is looking for outside funding sources before he starts the actual work.

Professor MacDonald is enjoying his work with this class of compounds so much that he now often regrets not concentrating on diendynols earlier in his career. After all, it should not be too difficult to imagine the functional groups most appropriate for his molecules, if Old MacDonald had a lab: en-yn-en-yn-ol.

Literature Cited

1. Nickon, A.; Silversmith, E. F. *Organic Chemistry: The Name Game*; Pergamon: New York, 1987; pp 3, 15, 61.
2. Eaton, P. E.; Mueller, R. H.; Carlson, G. R.; Cullison, D. A.; Cooper, G. F.; Chou, T.-C.; Krebs, E.-P. *J. Am. Chem. Soc.* **1977**, *99*, 2767.