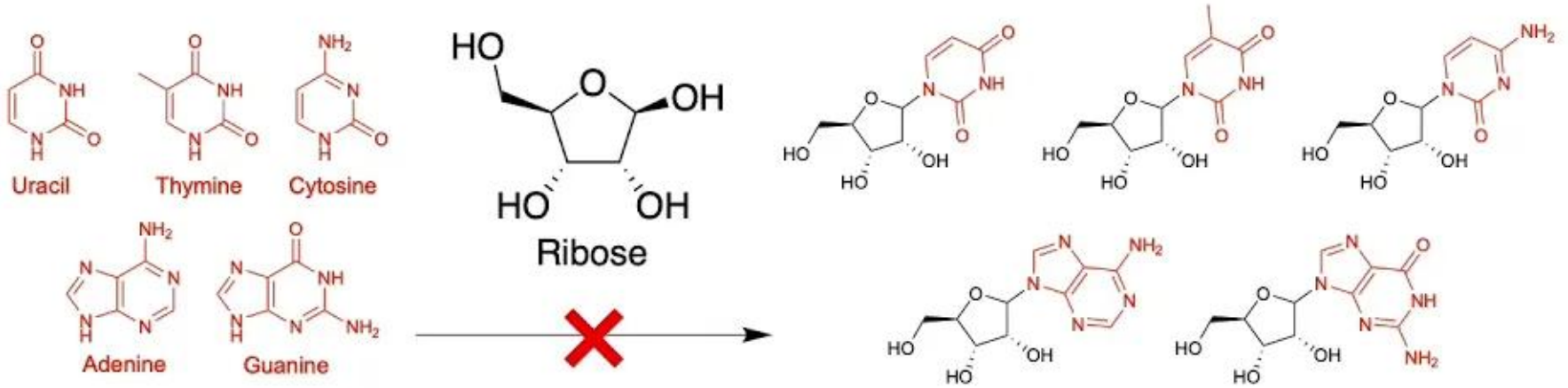
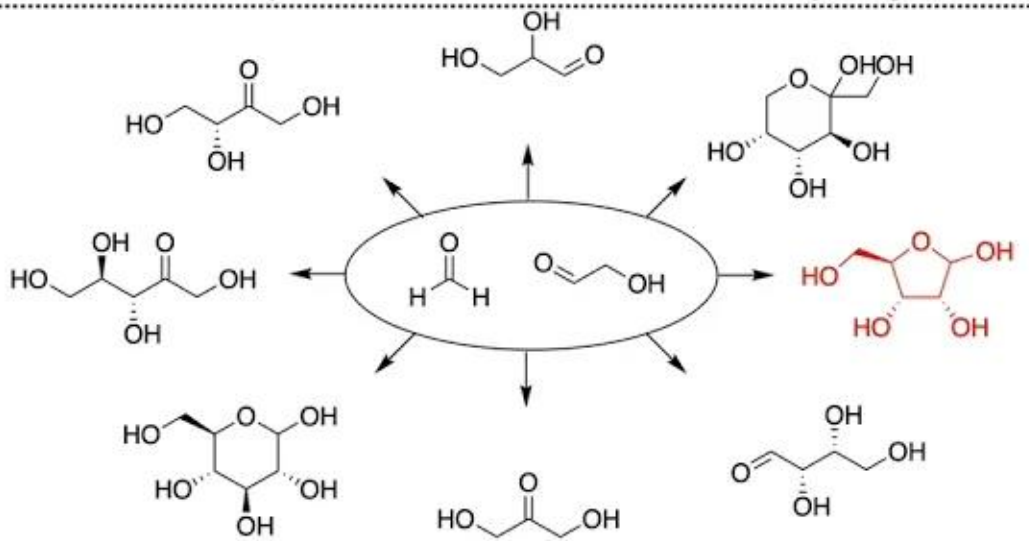
Nucleoside formation faces several challenges



Canonical nucleobases do not readily react with ribose (aside from minor adenine reactivity, Orgel, L. E., *Crit. Rev. Biochem. Mol. Biol*. (2004))



Traditional formose reaction yields myriad products (Decker et al., *J. Chromatogr.* (1982))

Georgia Tech Astrobiology

CENTER FOR CHEMICAL EVOLUTION

1
00:00:03,590 --> 00:00:01,990
hello my name is tyler roche and we'll

2
00:00:05,269 --> 00:00:03,600
be talking today about the formation of

3
00:00:07,190 --> 00:00:05,279
ribonucleosides from ketose

4
00:00:08,950 --> 00:00:07,200
intermediates

5
00:00:10,709 --> 00:00:08,960
prebiotic chemists have long struggled

6
00:00:13,589 --> 00:00:10,719
to form nucleosides from the canonical

7
00:00:15,030 --> 00:00:13,599
nucleobases and ribose in addition early

8
00:00:17,349 --> 00:00:15,040
sugar-forming reactions such as the

9
00:00:18,790 --> 00:00:17,359
traditional foremost reaction create a

10
00:00:21,029 --> 00:00:18,800
variety of sugars instead of

11
00:00:23,029 --> 00:00:21,039
specifically forming ribose

12
00:00:25,189 --> 00:00:23,039
my research shows that ketosis can

13
00:00:27,189 --> 00:00:25,199

isomerize to react with non-canonical

14
00:00:29,509 --> 00:00:27,199
nuclear bases such as barbituric acid

15
00:00:31,830 --> 00:00:29,519
and form nucleosides first of all

16
00:00:33,990 --> 00:00:31,840
ribulose can do this to isomerize to

17
00:00:36,549 --> 00:00:34,000
ribose and arabinos to form pentose

18
00:00:38,630 --> 00:00:36,559
nucleosides and second of all fructose

19
00:00:41,110 --> 00:00:38,640
can do this isomerizing to glucose or

20
00:00:43,510 --> 00:00:41,120
mannose to form hexose nucleosides

21
00:00:45,830 --> 00:00:43,520
finally fructose can undergo retroaldol

22
00:00:47,990 --> 00:00:45,840
reactions to form pentoses which form

23
00:00:49,910 --> 00:00:48,000
pentonucleocides

24
00:00:52,790 --> 00:00:49,920
this work reveals a pathway from the

25
00:00:55,830 --> 00:00:52,800
simplest sugar precursors to hexoses and

26
00:00:57,670 --> 00:00:55,840
pentoses which can form nucleosides

27
00:00:59,189 --> 00:00:57,680
i'd like to thank my funding sources and